The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Appeal to Overseas Markets

BY this time THE CHEMICAL AGE is known in most of the chemical markets of the world, and the Annual Spring Issue has for years past introduced to those markets the products of British chemical manufacturers and plant makers. We have lately been reminded of the need of greater attention to the art of salesmanship in relation to British goods, and to the need of at least making known to overseas potential customers the goods we produce for their use. Yet the lesson is being very slowly learned.

We have more than once mentioned the number of inquiries we receive for information about British products from America and our own Colonies. As we go to press this week, a letter arrives from New York inquiring about a new floor cement to which a casual reference had appeared in our editorial pages, and asking how to obtain additional data about its composition and properties. Of course, the inquirer will be put in touch with the right quarter, but the mere fact that anyone in New York has to write to us for particulars of a British product capable of wide use in chemical works indicates either a lack of the necessary marketing organisation, especially on the publicity side, or that the producers are spending their money on publications that do not get to the right people.

And what has happened in this case must be happening in scores, if not hundreds, of others—that is, goods produced on this side for use of overseas customers; overseas customers in need of the very goods that are lying in our works; but no means of linking the two together. Only a little imagination is needed to realise the immense loss of trade that results from this want of liaison. The remedy is only to be found either in direct local representation, or in direct postal service, or by means of some journal that carries the information right into our overseas markets. Best of all is the utilisation of all these agencies in combination.

Sir Robert Horne, in a speech the other evening, pointed out the advances that America is making as an exporting country. Vast as her home markets are, they are becoming insufficient to absorb her huge production, and the export field has been explored with such industry and success that American export trade now reaches 1,000 million sterling a year against our own 700 million. It is not without significance that the New York Chemical Exposition this year is arranging an "Export Day," on which special efforts will be made to interest foreign buyers in American chemical products. The moral of all this is that to keep our export trade, still more to extend it, we shall have to exert ourselves more than in the past, and one of the most profitable ways lies in letting people who are in need of chemical products know that we produce them at the right price and of the right quality.

This year our Annual Spring Issue includes an interesting Lancashire section, for which Mr. Rex Furness has written an excellent survey of the chemical industries of Lancashire, and which contains notices of many of Lancashire's typical products in chemicals and chemical plant. Industrial chemistry is inseparably interwoven in the great textile and other industries of the country, and while Lancashire industries have been founded and developed on applied chemistry, chemistry itself, in meeting the vital needs of the other industries, has developed into an industry of the highest importance itself. It is satisfactory to find Mr. Rex Furness, in concluding his review, paying tribute to the founders of the chemical schools of Lancashire, and insisting that the maintenance of chemical education at the highest level is the surest guarantee of Lancashire's continued progress.

The Nitrate Merger

It is rumoured that two large producers of Chilean nitrate—the Lautaro Nitrate Co. and the Anglo-Chilean Corporation—are contemplating a fusion of interests. The Lautaro company is the largest individual producer in the Chilean nitrate industry, with an output at present of about 25 per cent. of the total annual production, which should be increased to over 40 per cent. in a few years' time. The Anglo-Chilean Corporation—an American concern controlled by Guggenheim Brothers—produces about 15 per cent. of the Chilean output, so that a fusion of the two would eventually bring under one control over half of the Chilean nitrate industry. Both companies have reduced production costs substantially by the introduction of mechanical mining devices, and further economies are expected. The annual productive capacity of the two concerns, it is estimated, will shortly exceed 1,500,000 tons. It is understood that four Lautaro directors have recently returned to this country after long negotiations with the Guggenheim interests.

As we go to press, confirmation of the above is made in an announcement by the chairman of the Lautaro company, Mr. J. O. Herrera, in the following terms:—"Negotiations have taken place between representatives of the Lautaro Nitrate Co., Ltd. and the Anglo-Chilean Consolidated Nitrate Corporation looking to the introduction of the Guggenheim process into the operations of the Lautaro Co. The plan under consideration contemplates the exchange of present Lautaro shares for Lautaro preference shares, with a bonus of new ordinary shares, and that compensation to Anglo-Chilean will be entirely in the form of new ordinary shares of the Lautaro Co.; also that a new Guggenheim process plant is to be financed with Lautaro bonds. The Chilean Government has indicated that it regards the plan as being in the interest of the nitrate industry generally. Details of the plan remain to be worked out and formal agreement made, after which the proposition will be submitted to Lautaro shareholders for their approval." This announcement marks a very important step in the consolidation of the Chilean nitrate industry.

Two Presidential Addresses

Seldom within the same week do we have two presidential addresses of such interest as those delivered last week by Sir Alexander Gibb, president of the Institution of Chemical Engineers, and Professor Jocelyn Thorpe, president of the Chemical Society. The first dealt with the co-ordination of engineering institutions and societies, and though the author, a distinguished engineer himself, dealt with the subject from the engineering point of view, his general theories apply very much to the conditions of the chemical industry or, indeed, to any field in which members of what is essentially one community find themselves, either historically or by reasons of policy, split up into separate and sometimes into rival groups. Sir Alexander's address is valuable historically in that it tells us how the same problem is being approached in countries so far separate as the United States, Austria and Japan. He seems to see, as indeed anyone familiar with Church history, for example, is bound to see, that whereas central unity is attractive and impressive and may bring obvious advantages, there are also merits in a certain degree of diversity and local autonomy. He has no drastic proposals for bringing all within one fold, but thinks the desired end is only to be reached by a gradual growth. Dr. Levinstein, in his speech at the chemical engineers' dinner, seemed much more sure that it would be for the good of all chemical organisations that they should all be one. His ideal is one central organisation, housed in one building, centrally financed, with one publication, one subscription, and one directorate. It takes one back to the early 'nineties when, amid the Bernese Alps, one listened to good men of various schools discussing the perennial problem of the reunion of the Churches. They agreed on this beautiful ideal of all being one, but when they began discussing the dividing lines such as the historic episcopate, re-ordination, etc., the comparatively simple causes of division emerged into great sacramental differences that tied the sections up more firmly than ever. Far be it from us to suggest any parallel between the chemical and the ecclesiastical minds; at the same time, one fancies, some of the existing chemical societies feel themselves to be much better as they are than under one comprehensive umbrella.

The address of Professor Thorpe from the chair of the Chemical Society indicated—distinguished organic chemist as he is widely recognised to be—how very much more than a pure scientist in the narrow sense he is. It was the speech of a scientist, beyond all doubt; but it was also the speech of a statesman, who sees how and where his own science touches industry and life, and has a vision of four kinds of co-operation—internal co-operation in industry itself, co-operation with pure science, co-operation with Government, and co-operation with labour. Research tends so often to restrict the vision to the task of the moment, that it is well from time to time for scientific leaders to take a survey that sweeps the whole horizon. This is what Professor Thorpe did at Leeds, and did extremely well.

Books Received

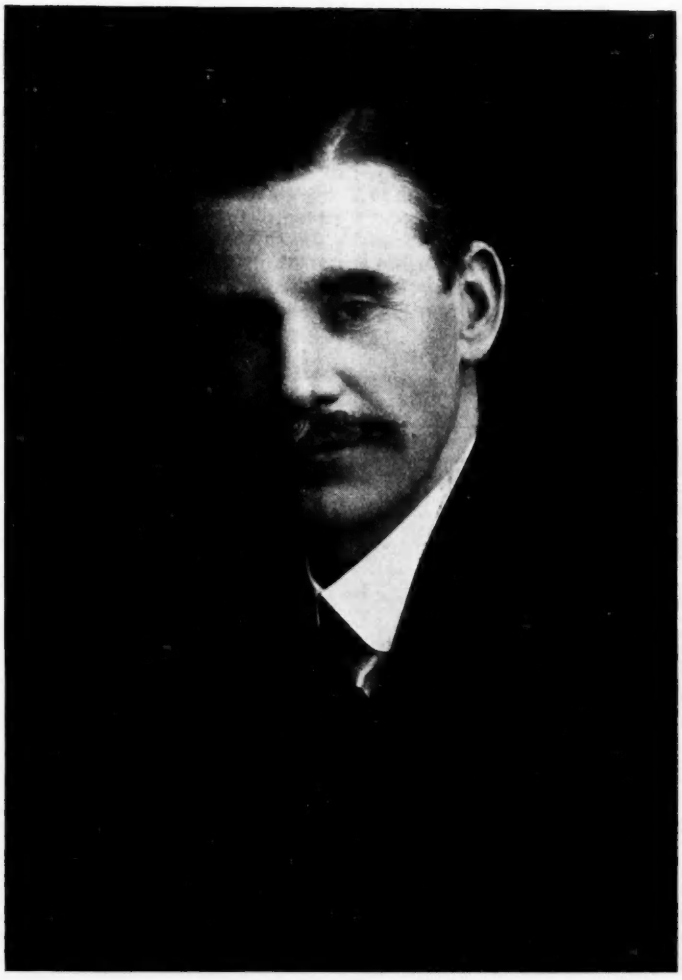
American Soap Maker's Guide. By I. U. Stanley Stanislaus and P. B. Meerbott. London: Chapman and Hall, Ltd. Pp. 709. 50s.

Industrial Carbon. By C. L. Mantell. London: Chapman and Hall, Ltd. Pp. 410. 21s.

The Calendar

Apl.		
2	Hull Chemical and Engineering Society: "The Future of the Gas Industry." H. E. Copp.	Grey Street, Park Street, Hull.
3	Society of Public Analysts: Papers by L. H. Lampitt, E. B. Hughes, H. S. Rooke, J. W. H. Johnson, B. J. F. Dorrington and Dr. A. M. Ward. 8 p.m.	Burlington House, London.
8	Society of Chemical Industry: (London Section): Joint Meeting with the Fuel Section. "Free Carbon Formation in Tars and Pitch." W. Gordon Adam. "Constituents of the Aqueous Liquors of Low Temperature Tars." D. D. Pratt.	Burlington House, London.

The New President of the Institution of Chemical Engineers



MR. JAMES ARTHUR REAVELL *was born at Alnwick, Northumberland, and was educated at Silcoates College, Wakefield. He served the usual training as an engineer, and subsequently was associated with an American company for some years, gaining, during that period, considerable American experience. He has been in touch with American interests ever since. For some years he acted as European manager for an engineering concern and had agencies and offices under his control throughout Europe, thus getting considerable experience in Continental, as well as American, manufacturing methods. Twenty-one years ago last January he joined Mr. Paul Kestner, an old friend, and formed the Kestner Evaporator and Engineering Co., Ltd., which replaced his business, which had previously been run as an agency only. This company controlled the Kestner patents for Great Britain and the Colonies. The business founded on Mr. Kestner's original evaporator patents has been developed and expanded owing to the many patents, both for apparatus and processes, taken out by Mr. Reavell. Among a considerable number of patents taken out, he has particularly specialised in apparatus for evaporation, drying, and crystallising. In addition, many patents have been acquired and developed by his company so as to cover a very large range of chemical plant. He has acted as adviser in connection with modern developments to some Indian native States, and is now State representative of one of the most progressive of these. He has been responsible for some very large contracts up to over £200,000.*

With regard to other offices, most of our readers know of Mr. Reavell's work in the Chemical Engineering Group of the Society of Chemical Industry. The first president of the Group was Professor Hinchley, whose health broke down during his first year. Mr. Reavell took his place and put in four years' hard work in getting the Group on to a thoroughly sound basis. He was one of the founders of the Institution of Chemical Engineers, has served on the Council of the Society of Chemical Industry, and is chairman of the British Chemical Plant Manufacturers Association. He has always taken an active part on all committees where chemical engineering is in any way concerned. He has been a Member of the Institution of Mechanical Engineers for very many years. "The only reason I go to business," Mr. Reavell states, "is because I enjoy it. It is one of my three hobbies, the other two being shooting and fishing. My motto is: 'Perseverance is irresistible.'"

The Chemical Industries of Lancashire

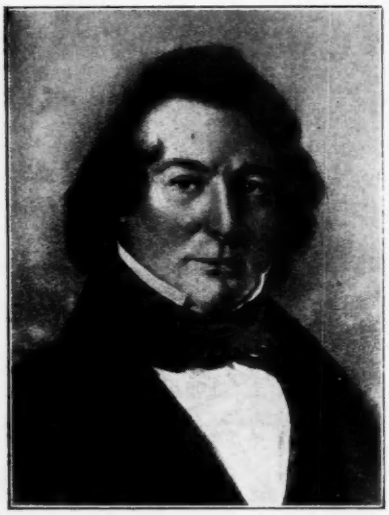
By Rex Furness

Without attempting a complete history of Lancashire chemical industries—a task quite impossible within the space of a single article—our correspondent succeeds in conveying a very good general impression of the important part that industrial chemistry plays in the industries of Lancashire, and its importance as an industry in itself. It is no fanciful claim that the chemical factories of Widnes, Runcorn, Warrington, Northwich, St. Helens, and Merseyside in general must be accounted a national asset.

INDUSTRIAL Lancashire has perhaps not been in her happiest frame of mind during the past few years, largely on account of the depression in the cotton industry, but it has never been a characteristic of her hardy sons to "chuck oop" in despair or despondency. There is a considerable hope that in the not-too-distant future, as in the past century or so, the cotton trade of Lancashire will represent one of the most prosperous in the country, and provide one-third of the total exports from our shores.

The manufacture of cotton goods has a great history, and it has, too, one important memory in that, to a large extent, it was responsible for the foundation of the chemical industries of Lancashire.

It was not long after the epoch-making inventions of Arkwright, Hargreaves, and Crompton that cotton began to be manuactured in real earnest, and, following the erection of the first mill in 1781 and its rapidly growing family, it soon became apparent that many chemicals must be made near at hand for processing the cotton yarns and goods. To take but a single instance at the moment, it became apparent towards the close of the eighteenth century that the whole area of the county would not suffice to give space for the sun bleaching of the amount of cotton made, and chlorine bleaching compounds were demanded of the chemist.



JAMES MUSPRATT, FOUNDER OF LANCASHIRE'S ALKALI INDUSTRY.

If we construct a fanciful genealogical tree with Old Man Cotton at the head, we have to place chlorine bleaching compounds, soaps, and alkalis as his first offspring, and in the third and fourth generations we find that his descendants have lived in almost every phase of industry. Lancashire chemical factories supply materials that are essential to the cotton industry in the shape of scouring alkalis, soaps, bleaching agents, sizes and finishes, etc., dyestuffs and dyestuff adjuncts, and many incidental materials, but, in addition, they provide acids for fertiliser making, rubber vulcanisation accelerators and accessories, glass making materials, leather manufacturing requisites, acids, alkalis, and salts for metal working, wire drawing, sugar manufacture, glue and gelatin manufacture, pharmaceutical and medicinal chemicals production, and for a variety of "fine" chemicals and general products manufacture.

It is not to be forgotten, however, that Old Man Cotton would have called in vain for his chemicals from Lancashire factories had not the county and its border counties been possessed of valuable natural resources in the shape of salt, coal, pyrites, etc., and had not the potential means of cheap transport been developed by Lancashire men of keen vision and foresight. With the advent of the locomotive, the construction of canals and the improvement of natural waterways, the transport of raw materials and finished products became relatively rapid and cheap, so that in the end, by reason of the intensive working of natural resources in combination with a keen appreciation of commercial, transport, and other related possibilities, the chemical industries of Lancashire progressed from strength to strength.

Let us examine in somewhat more detail a few of the important branches of the chemical industry of Lancashire, and crave pardon at once if we stray over the border into Cheshire occasionally.

Heavy Chemicals for the Cotton Industry.

From the cleaning of the raw cotton right through the processes of spinning, weaving, etc., to the sizing, finishing and dyeing of the yarn or piece, the cotton industry demands a variety of chemical products which it would be wearisome to catalogue. Let us, therefore, select a few highly important heavy chemicals and note how their production has been developed in Lancashire factories until to-day they are supplied not only to cotton manufacturers in the county, but to a world of industry.

Although in the very early years of the nineteenth century chemical bleaching agents—chlorine water, hypochlorite solution, "Eau de Javelles" and bleaching powder— were called for by cotton manufacturers and were actually made (at first without the county), and alkalis were made in Lancashire from imported potashes and barilla, it was not until after the repeal of the salt tax in 1823 that the famous Leblanc process for making soda from salt began to be worked by Muspratt of Liverpool.

From that date onwards, however, larger and larger quantities of soda came to be made, and, in spite of many changes of fortune and many wild dances on the edge of the precipice of economic failure, the Leblanc process lived for a whole century. The hydrochloric acid evolved in the first stage when salt is treated with sulphuric acid to produce salt cake was at first wasted into the atmosphere. As a consequence of economic, æsthetic, and legal pressure, the acid gases were later recovered in washing towers, and a valuable by-product added to the waning fortunes of the alkali makers. In the conversion of salt cake to soda crystals, huge amounts of "alkali waste" were made and tipped in evil-smelling mounds about the countryside. With the coming of cheaper alkali from the ammonia-soda process developed by Brunner and Mond, the Leblanc process had again to find new sources of revenue, and the Chance process of sulphur recovery from "alkali waste" brought salvation.

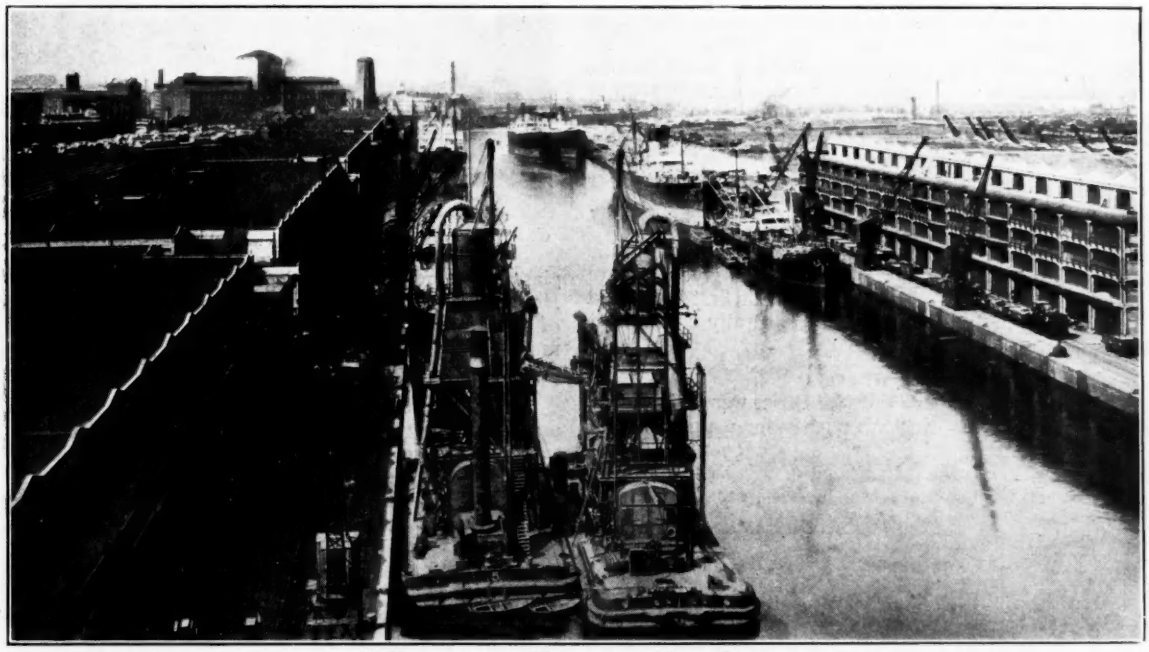
And the story might go on with an interplay of action between the ammonia-soda process and the electrolytic process of alkali making—wherein, in a single operation, valuable caustic soda and chlorine are produced—until the finale, in 1923, when we see the Leblanc process, as such, quit the stage of production after a whole century

of throbbing life. This is not the place to trace the stages through which, by chemical and commercial genius, the Leblanc process passed successfully in the face of severe competition, but it must be said that this branch of the heavy chemicals industry laid the foundation of Britain's chemical trade and industry so surely as to make possible all the more spectacular developments of recent years.

The Leblanc process, the ammonia-soda process, and the electrolytic alkali process have supplied all the alkali required for the cotton industry as well as much more for other industries and for our large export trade. In addition, they have involved the production of sulphuric acid, hydrochloric acid, and nitric acid, chlorine bleaching compounds and latterly liquid chlorine itself, salt cake, sodium sulphide, silicate of soda, caustic soda and much else without which the glass maker, the tanner, the fertiliser manufacturer, the tar distiller, the soap maker and the producer of edible oils and fats and the manufacturer of

The raw materials for dyestuffs making have always, paradoxically enough, been on our very doorsteps. The tar distillation industry thrives around Manchester and in other parts of the county, and Lancashire tar products before the war provided the foundation of many German dyestuffs. To-day, whilst benzol, creosote, and other tar products form a valuable part of our exports, much of Lancashire's production goes to home dye-making factories.

The heavy chemicals such as sulphuric acid, nitric acid, chlorine, alkalis, etc., which are required for the production of dye intermediates—for nitration of hydrocarbons, phenols, etc., sulphonation, chlorination, caustic fusions, etc.—are made in Lancashire chemical works, whilst some of the older "heavy chemical" factories themselves make such intermediates as nitrated and chlorinated benzols, nitrated phenols, chlor-nitro phenols, and so forth.



A View of the Manchester Ship Canal.

dyes and fine chemicals and many others could never have plied their trades.

Truly the chemical factories of Widnes, Runcorn, Warrington, Northwich, St. Helens, and Merseyside in general, are to be reckoned as a great national asset, one of which Lancashire may well be proud. The end is not yet, for even in these busy centres and with newer chemical industries springing up north and south, new enterprises are being embarked upon and are progressing, we trust, to a success worthy of comparison with the achievements of the past.

Coal Tar and Dyestuffs

It is a matter of history now so very well known how the manufacture of synthetic dyestuffs was first established in England and how, until the war years, the ground we had lost to Germany appeared to be of no concern. In post-war years, a great change has come about, and, to indicate the position in a single pregnant sentence, it may be said that instead of making about 20 per cent. of our requirements and importing 80 per cent. as in 1913, to-day we are making 80 per cent. and importing 20 per cent. In this greatly increased production of artificial dyes, Lancashire factories claim no small share.

Many materials are required for the application of dyestuffs to the fibre, and supplies of alums, chromates, and dichromates, tannic acid, sulphonated oils (Turkey red oil), are made in Lancashire factories.

Again it must be remembered that the chemical factories of the county do not confine themselves to the "home trade" of Lancashire, and alums for water treatment, chromates and chromic salts for mineral tanning of hides, sulphate of iron (copperas) and copper sulphate, and many other salts are made in large amounts.

Further, at this stage it is convenient to refer to the "side lines" of some of the dye-making works of the county, although in many instances, they represent very profitable spheres of endeavour.

Synthetic organic chemicals, made from intermediates commonly used for dye production, find applications in rubber factories as accelerators of vulcanisation, antioxidants which prevent the deterioration of rubber upon ageing, special rubber colouring materials, etc. Similarly, photographic chemicals, disinfectants, germicides, fungicides and many other products seem to fall naturally into the field of production of Lancashire dyestuff works.

Soaps, Fats, and Glycerine

The British soap trade, both at home and abroad, is in such a satisfactory condition to-day that it is doubly welcome to record in this article on Lancashire chemical and allied industries that the county possesses perhaps the most important soap factories in the land.

Right away back in 1709, soap was being made near Southport, and before the end of the eighteenth century, there were other factories also producing. During the nineteenth century many firms whose names are household words to-day, throughout the world, came into existence, so that it may justly be claimed that Lancashire is responsible for the greater part of British soap manufacture—if we may be permitted to include Port Sunlight in the county. Whilst in 1850 some 25,000 tons of soap were made in Lancashire, to-day even the exports from the county, quite apart from a vast home trade, amount to almost three times this figure.

Commencing with the production of textile and laundry soaps, production has spread to all classes of soaps, including the finest types of perfumed toilet soaps, whilst, in addition, soap factories have enlarged themselves to make caustic soda, silicate of soda, and other materials allied to soap or required in its manufacture. Silicate of soda, for instance, was first made in Lancashire, and used as a soap adjunct. To-day, it finds a hundred uses in all directions, from the making of adhesives to fire-proof cements, from paper sizing to concrete road treatment, from barrel lining to frosting electric light bulbs, and so forth.

A large industry in edible fats has sprung up alongside the soap industry, and large amounts of glycerine are manufactured—although glycerine was not first recovered from soap lyes in Lancashire—both naturally consequent upon the use of fats in soap making.

Leather

It is more than a century since tanneries were established at Runcorn, and ever since then they have prospered in the locality, and in other parts of the county. When tanners began to see the advantages of using concentrated tannin extracts instead of barks, berries, etc., it was but

BARTON AQUEDUCT, WHICH CARRIES THE BRIDGEWATER CANAL OVER THE SHIP CANAL.

natural that the manufacture of these extracts should be situated in the same neighbourhood as the tanneries. Tanning adjuncts are made locally, as well as chrome salts for mineral tannages, while salt cake, from the Leblanc process, serves as a raw material for the production of sodium sulphide, largely used in leather making.

Glass

The availability of home produced salt cake, alkalis, sand, and other necessary raw materials has considerably stimulated the Lancashire glass-producing industry, and no small part of the activities of Lancastrians is spent upon glass-making. There are records of the existence of glass factories long before the age of Lancashire chemicals, however, and one existed in Liverpool in 1715.

With the repeal of the glass duty in 1845—and again with the availability of chemicals—rapid increase in the number of factories and the amount of production occurred. It is impossible to give even bare details of the kinds of

UNIVERSITY OF MANCHESTER (FORMERLY OWENS COLLEGE)

glass made, for these are legion, and the mention of St. Helens will probably be sufficient to set the mind thinking of green and flint glass, crown and plate glass, bottle glass, fine glass for stained glass windows, and so on.

Sugar, Matches, Ultramarine, etc.

Sugar has been manufactured in Liverpool since 1667, and, a century ago, there were twenty-nine refineries in that city. The number to-day is less but the industry has advanced in importance and productive capacity. Smaller works exist in other parts of the county.

The match industry is of later origin, naturally, but for about a century matches have been made in Lancashire, and the immense works at Bootle is an important economic asset of the county.

Raw materials for the making of ultramarine are either produced in Lancashire chemical factories, or are largely imported, for various purposes. Hence, the manufacture of the ultramarines is of consequence, and the product is utilised in mottled soap making, laundry work, paint and paper making, inks, etc.

Rosin is required in soap making, and is largely imported into the county. Hence it is natural that, in addition, turpentine distillation be practised. Starches, gums, etc., used in the textile industry are made in Lancashire, which, naturally, specialises in all products required for the treatment and " finishing " of cotton yarns and goods.

Carbon dioxide is produced at Bootle, perhaps particularly by reason of the large shipping trade in refrigerated foodstuffs and fruits to the port of Liverpool. It may be that larger amounts will soon be made, perhaps from the purified fermentation gases coming from many famous Lancashire breweries. The industry of " dry ice "—solid carbon dioxide—has only just commenced in this country, but it appears to have a significant future. A Lancashire firm has developed an activated charcoal purifying plant, for treating fermentation gases economically. Activated charcoal is also made for other purposes.

In Lancashire is also made the most efficient base exchanging compound known, and large quantities are supplied to various parts of the world for water softening, and other purposes.

Other industries, allied to the truly chemical industries, which can only be mentioned but which are of considerable importance, include linoleum manufacture, cement making, metal and alloy production, and the making of many adjuncts for the metal industries, paint and colour manufacture, fertiliser, and feeding stuff manufacture, pharmaceuticals, disinfectants, insecticides, sheep dips, mineral water " chemicals," and essences, paper making, etc.

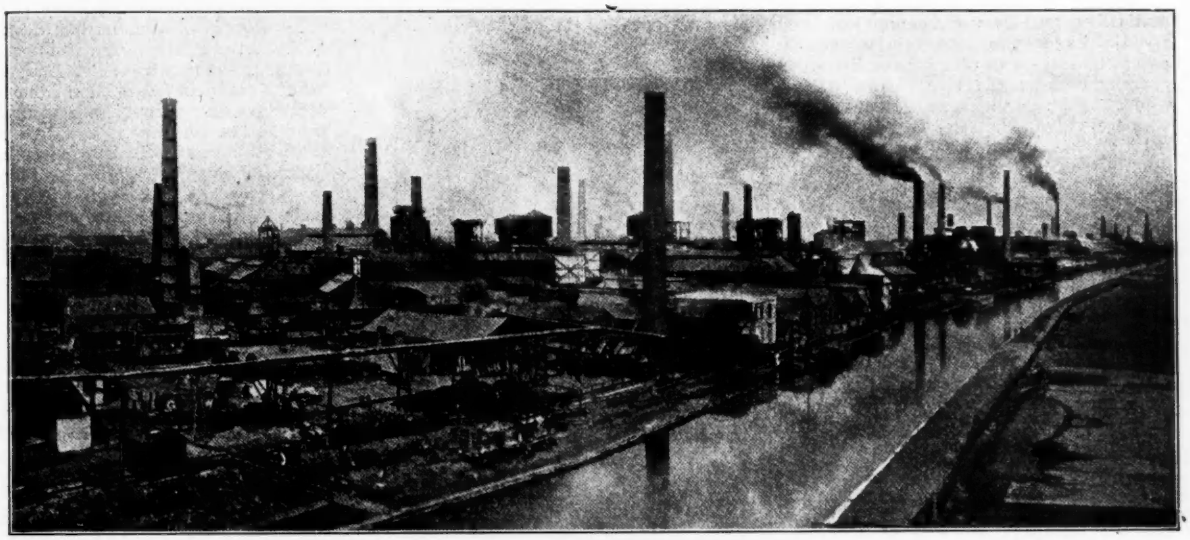
Lancashire Universities and Technical Institutions

The history of education in Lancashire makes interesting reading. There are many ancient Grammar schools and educational institutions, and, long before the birth of the famous Universities of Liverpool and Manchester, the Warrington Academy flourished as a real university of the North. To-day, the various technical institutions afford ample opportunity for the training of the junior chemist, whilst we must be content to note only briefly the chemistry schools at the two Universities mentioned and at the Manchester School of Technology. The names of many famous chemists occur to one's mind, and the general researches of Roscoe and Schorlemmer, the work of Dixon on explosions in gases and in connection with coal mine explosions, those of Perkin on the alkaloids, terpenes, synthetic rubber, etc., of Robinson on natural colouring matters, alkaloids, etc., the work of Baly on the synthesis of carbohydrates from carbon dioxide and water, the comprehensive studies of Hilditch upon the constitution of fats and oils, and the important work of the present and former staff of the School of Technology upon synthetic dyes, coal and tar, combustion, textile chemistry and so on, represent but a small selection out of a world of valuable research which has been accomplished, and which has attracted young and advanced students to the county.

Reference must also be made to the work steadily pursued at the laboratories of the Cotton Research Association, where fundamental and immediate problems of import to the cotton industry progress. The Lancashire cotton manufacturer is turning his attention to the claims of artificial silk, and whilst the fibre itself is being made in the county, more interest attaches, at the moment, to the use of artificial silk in conjunction with cotton. Some beautiful new fabrics have been produced and the whole field of artificial silk chemistry and application is receiving full study.

It is gratifying to note that the temptation to early specialisation in the Lancashire Universities chemical schools has been resisted, but we may plead that the tendency towards the mass production of chemists, merely stereotyped with letters, be equally strongly repressed. The success of Lancashire men in applied chemical endeavour has ever been won upon the basis of individuality and originality, and it is the man and not the letters alone that signifies. Further, in an age of chemistry, with an essentially materialistic science assuming ever greater and greater influence, it is essential that general culture in its best sense be fostered. We cannot develop the topic at the moment, for already we have outrun our space, but we would urge that the Chemistry Honours Schools should vibrate with a living soul. The philosophy of an efficient, industrial chemist can be so broad as to embrace art, literature, and music, and real life and human inter-relationships and introspection may well thrive.

Lancashire has a proud record in war and peace, in work and play, in prosperity and adversity. In the foundation and progress of the British chemical industries she may feel well satisfied with her efforts. The future is probably to be more difficult, but the traditions of the Lancashire heavy chemical industry will stimulate endeavour which, in turn, will bring success.



View of United Alkali Works at Widnes.

Textile Research at Leeds University

In the Departments of Textile Industries and Colour Chemistry and Dyeing of the University of Leeds, the progress of research work has been stimulated by a recent grant of £3,000 a year for four years by the Clothworkers' Company of the City of London, enabling the University to institute a lectureship in textile physics and two assistantships and eight fellowships and scholarships for graduate students. With the same object in view the University has conceded to selected research workers attached to the laboratories at Torridon of the British Research Association for the Woollen and Worsted Industries the privilege of reading for higher degrees at the University. These developments have quickly borne fruit, the number of graduate workers in the Department of Textile Industries being nearly three times what it was last session. There are also 80 per cent. more full-time students and 13 degree students as against five. Several lines of research in this department are, says the report for 1927–28, converging to give an interpretation of the molecular structure of wool.

Chemical Plant and Chemicals

Notes on Some Products Manufactured in Lancashire

The numerous manufacturers of Lancashire produce chemical plant, chemicals and materials of chemical interest in great profusion. The following notes give some account of various types of products of the county.

Acid-Resisting Plant

THE development of acid-resisting chemical plant is one of the features of industrial conditions to-day. The enormous number of plants being put down for the manufacture of artificial silk has provided great scope for plant manufacturers. The selection of materials to withstand the action of acids has received much consideration. Of acid-resisting metals, few materials have a wider use than "Meldrum" acid-resisting metal, which will stand both nitric and sulphuric acids perfectly, and, as it is also resistant to acetic acid, its use in the artificial silk industry is extending. Plant made of this material is supplied by Meldrums, Ltd., of Timperley.

The "Meldrum" acid pump has found great favour in artificial silk factories. In this pump leakage at the gland is eliminated. It has a compound gland, the space between the two glands being connected to the sump or pump suction, and in this way any acid coming past the first packing is automatically drawn away and cannot leak further along the spindle. In addition to the pumps, in many cases the lengths of piping have been completed. In the larger sizes of piping, lead pipes become difficult to support, and if they are laid on the floor they are liable to be damaged and flattened. A number of coils for heating sulphuric acid baths have been made. These are supplied with acid resisting-bolts and nuts.

For boiling by the open steam method, jets are made in "Meldrum" metal with good results. It is surprising how many firms still use the open steam pipe, which is very noisy and causes a lot of trouble due to vibration injuring the tanks. A silent boiling jet keeps rapid circulation up in the tank, and gives equal temperature all over.

Efficient cocks and valves in acid-resisting metal are of great importance. There is nothing more annoying than a valve which, when supposed to be shut, persistently drips, or one which when shut refuses to open when required. A complete range of valves are manufactured both in "Meldrum" acid-resisting metal and also in regulus metal. In the valves, a through passage is obtained, and they can be kept tight under all conditions. In the regulus valves the plug is made of "Meldrum" metal, which is a very suitable material when in contact with regulus metal.

THE HON. HENRY MOND, M.P. FOR THE EAST TOXTETH DIVISION OF LIVERPOOL.

A special plant is installed at Meldrum's works for the manufacture of very large vessels, and these can be manufactured with ease up to 700–800 gallons capacity. Many vessels of this size are fitted with agitators. Some interesting work which the firm has in hand at the present time is special plant for the refining of oils. Many of these plants run to over 1,500 gallons capacity, and the oil is refined by means of special clays. The vessels are usually jacketed, and provided with special types of agitator to give a very thorough mixing. Small plants for manufacturing very special kinds of oil are made as small as 100–150 gallons capacity.

The absorption of gases has received considerable attention at the hands of Meldrums, Ltd., and the gas scrubber manufactured by them is in great demand in coke oven installations. This plant is equally good on the absorption of both benzol and ammonia. An additional plant is in hand for the East Indian Railway Co., the two supplied previously having proved very satisfactory. At a dye-manufacturing works where large quantities of ammonia are used, a plant for recovering the ammonia has saved its value several times every year. With the "Meldrum" plant a very concentrated liquor can be obtained. The plant consists of a number of washing chambers superimposed, usually to the number of 6 to 9. Each chamber forms a reservoir for the washing medium. The shafts are of very large diameter to give complete stability, and run in ball and roller bearings of very large size.

A Non-Chokable Pump

For handling liquids containing solids in suspension some types of centrifugal pumps present difficulties. Mather and Platt, Ltd., of Park Works, Manchester, and Park House, Great Smith Street, London, have, as the result of careful investigation, developed the "Karntclog" pump, a simple pump which is designed to be absolutely unchokable and yet to retain those characteristics which are essential in a centrifugal pump for prolonged and satisfactory service. It will pump, without choking, any solids which will pass through the suction pipe into the pump. The impeller is of symmetrical design, giving an even discharge and perfect balance. It is extremely robust and all parts subject to abrasion from the solids passing through are specially thick. The impeller is keyed to the shaft and secured by special means which obviate any projection into the water passage. The passages through the pump are of constantly increasing cross section from the inlet branch to the delivery branch. The gland and internal bearing are protected by a clean water chamber. The pump is designed to give reasonable heads at very slow speeds, thus reducing wear. The "Karntclog" pump is capable of dealing with hard or soft solids in suspension, semi-solids and sludges.

Conveyors

The outstanding features of the construction of the conveyor machines manufactured by Crone and Taylor, Ltd., of Sutton Oak, St. Helens, are as follows: Simple elevating gear, consisting of handwheels with screwed gunmetal bushes which operate the elevating screws, the elevating gear giving a wide range of delivery, namely, from 7 ft. 9 in. minimum to 13 ft. maximum; roller bearings fitted throughout, mounted in dust-proof housings, and not requiring lubrication oftener than once a month; lubrication carried out by means of a high-pressure grease gun, which is supplied with the machine; transmission throughout by means of roller chains, running on machine-cut sprockets. The tension of the band is adjusted by means of tension screws, fitted at the feed end of the conveyor. Ample protection is provided for the returning band. The machines are arranged for drive either by electric motor or petrol engine. The standard machine has a capacity of up to 20 tons per hour. The machines are very mobile, and can be moved along level ground by one man handling the 4 ft. diameter road wheels.

Measuring Apparatus for Water and Coal

In connection with the chemical and allied trades, many problems of measurement arise in all departments, and the Lea Recorder Co., Ltd., of 28, Deansgate, Manchester, have endeavoured to meet this demand in various directions. Lea recorders are particularly suitable for measuring boiler feed water, being simple in operation, extremely accurate, and capable of being checked for accuracy at any time without any trouble. They operate on the float principle, and are

used in connection with a "V" notch, which is a very accurate form of measurement. Where boilers are fitted with mechanical stokers, Lea coal meters may be fitted to measure automatically the amount of coal fired, and by knowing the weight of coal used and the water evaporated, the value of lbs. of water per lb. of coal may be obtained quite easily. Lea recorders are also in use for measuring chemical liquors, and in connection with artificial silk manufacture. There are

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many cases where the measurement of coal in bulk would be an advantage, and for this purpose the Lea "Cubi-Meter" has been designed, and is now in very successful use.

Scientific Instruments and Chemicals

The business carried on to-day under the title of James Woolley, Sons and Co., Ltd., in Manchester, was founded in 1796. The works, laboratory and drug mills are situated in Knowsley Street, Cheetham. In 1921, the shortage of warehouse accommodation, situated at Victoria Bridge, Manchester, became acute, and additional premises were acquired at 76, Deansgate, Manchester. The firm supplies scientific instruments of every type, chemical apparatus, and chemicals, reagents and standard solutions for analytical, laboratory and other use.

Iron Carboy Hampers

R. H. Leigh and Sons, Ltd., of Orlando Ironworks, Bolton, are the original inventors of "Zulo" iron hampers for carboys. This company has developed and specialised the carboy hamper from its earliest stages, and has firmly established this all-metal hamper constructed from mild steel hooping. The company also supplies glass carboys either packed in hampers or without hampers; safety crates and top protectors for double basketing, specially suitable for rail traffic in single carboys and small lots; carboy stoppers and fasteners; and rubber caps. A very interesting apparatus is the carboy tilter for drawing off small quantities of acid, the large number of important users of which mentioned in the catalogue points to its popularity all over the country. Various designs of emptiers are available, as well as carboy barrows and trucks.

Steel Containers

Steel containers of various types are produced by G. T. Johnson and Co., of 63, Great George Street, Liverpool. Their products include kegs, open top with full loose lid; drums, with centre filling hole and lever lid; drums with soldered joints (double seamed or double hooped); drums, with welded joints; and taper cans, with soldered joints. These can be supplied in plain black steel, lead coated steel, pure tinned or galvanised steel, with plain or corrugated bodies, hooped or double seamed ends, and various closing devices (lids, screw-bungs, corks, etc.), and up to 20 gallons capacity. They are used as containers for paints, colours, grease, paste and powder goods, liquids, disinfectants, oils, etc.

Indestructible Drums

E. A. Brough and Co., of 4, Upper Parliament Street, Liverpool, specialise in the manufacture of patent indestructible drums and kegs. These include inside banded drums; bevel-edged welded drums; inside and outside banded drums, Admiralty welded throughout; kegs with unburstable seams, bevel-edged welded bottoms and waterproof fit-over lids; and all-steel tapers, with welded steel neck and bevel bottoms. The patent bevel-edged drums can be filled and dropped 51 ft. without bursting. The patent corner-neck drum, with solid drawn steel neck with strengthening flange round the bottom, is specially designed to drain to the last drop.

Metal Kegs, Drums, Boxes and Canisters

Three extensive modern factories, equipped with the latest types of tools and machines, are operated by Reads, Ltd., of 21, Bridgewater Street, Liverpool, who manufacture metal kegs, drums and tapers, and tin boxes. The firm was established in 1869, and the products range from a box holding an ounce to a drum holding 30 gallons. Their customers include industries manufacturing chemicals, oils and colours, varnish, cement, printing ink, soap, etc., specific materials packed in their containers including glycerine, disinfectants, light and heavy lump and powder goods, soft soap, sodium silicate, water glass, etc.

Resistant Asphalt

John Dickinson and Co. (Bolton), Ltd., of Fairclough Street Bolton, have of late years intensively specialised in the production and laying of mastic asphalt for all appropriate purposes (roofs, floors, tanks, and building and industrial purposes), the firm possessing a modern plant and adequate accompanying laboratory and skilled technical and working staffs. They are able to supply materials to concerns who desire to lay the material themselves, or they will lay the asphalt complete under closely-drawn-up specifications and maintenance guarantees. Amongst their specialities appealing to those manufacturing and using dyes and other chemical products, rayon, etc., are Dickinson's "Aciteneo" acid-resisting mastic asphalt for floor surfacing and tank lining; "Tropicas" mastic asphalt to meet heavy industrial floor and roadway duty under temperatures and other conditions more exacting than the normal; and "Seal" mastic asphalt for flat roof covering and the watertight lining of wood, brick, concrete or metal tanks.

Metal Castings, Engineering Work

The engineering firm of Lancaster and Tonge, Ltd., of Pendleton, Manchester, manufacture steam traps, pistons, metallic packings, steam dryers, throttle valves, machine moulded wheels, general engineering, iron and non-ferrous castings

THE ROYAL TECHNICAL COLLEGE, SALFORD.

and anti-friction metals, under the mark "Lancaster R.T.M." Of their steam traps 130,000 have been sold: the bucket type is especially designed for use where large bodies of liquid are heated by coils or jackets, and is of special importance for high pressure work; there is another type for ordinary pressures (2 lbs. to 250 lbs.); while the "Compact" trap is designed for the use of those who require a trap which will go in a small space, and yet give a copious discharge. Of the firm's piston,

rings and metallic packings 83,000 have been sold. The firm does a great deal of general repairing, breakdown work being a speciality.

Pulverisers and Granulators

Pulverisers and granulators are manufactured by the Gannow Engineering Co., Ltd., of 29, Victoria Buildings, St. Mary's Gate, Manchester. Especial mention may be made of the Gannow pulveriser, design 3A, used in the treatment of ammonium sulphate, barytes, phosphates and phosphate rock, pyrites, animal and fish manure, guano, etc.; the Gannow patent granulator, "G" type, for stone, minerals and hard materials; and the portable Gannow granulator and pulveriser. Gannow plant is in extensive use among chemical and fertiliser manufacturers, quarry owners, and public bodies such as corporations and councils, for rapidly and efficiently granulating and pulverising dry or wet substances ranging from hard rock to soft refuse. The materials treated, in addition to those mentioned above, include municipal refuse, oil cakes and cattle foods, chemicals and fertilisers, peat moss, cork, minerals, etc.

The Co-ordination of Engineering Institutions

By Sir Alexander Gibb

We give below the substance of the important presidential address delivered by Sir Alexander Gibb to the Institution of Chemical Engineers on March 20. Taking as his subject "The co-ordination of engineering institutions and societies," Sir Alexander discusses various lines of approach, reviews what has been done in other countries, and concludes that the two most hopeful methods are the grouping of kindred societies and the gradual evolution of joint councils.

It is obvious that there is a considerable wastage of effort and a retardation of progress caused by the almost haphazard dissemination of scientific effort in general, and engineering effort in particular, over the growing multitude of technical institutions and societies that now exists.

At the present moment there are, in this country, so far as I have been able to ascertain—and I am quite ready to believe that my information is incomplete—more than one hundred institutions, institutes, societies and associations devoted more or less directly to the science, subject, and practice of engineering. There is, I suppose, general agreement on the advantages to be gained from the greater concentration of these activities. I would say they are in the first place, an economy in actual expenditure on the provision of housing, libraries, records, and other facilities; secondly, the consolidation of professional interests and the improvement generally of the status of properly qualified engineers in the eyes of the world at large; thirdly, the provision of effective means of securing for the engineering profession the influence that it should have when political, departmental, or other interests threaten it; fourthly, the prevention of overlapping in intellectual effort and the co-ordination of scientific study and research; and lastly, and really the most important—being the chief reason and justification for the existence of all engineering institutions—the protection of the public from unqualified persons. I suppose there must be a complete answer to every question; but I doubt whether the complete answer to this one is to be found in our time, if ever.

Taking our own country first, it will probably be a surprise to many to realise how much has already been done. The problem has been approached in a number of different ways, among them amalgamation, affiliation, the establishment of joint councils, the grouping of kindred societies in one building, and general co-ordination by registration or otherwise.

The Question of Amalgamation

Amalgamation is the obvious remedy proposed by the critic who has not studied the problem very closely. It is not and never will be a solution. There have been occasions, where two or more institutions cover exactly the same ground, when amalgamation has been the proper course, and the course has been taken with conspicuous success. Recently we have seen an example in the Institute of Fuel. I am not sure that the Institution of Mining and Metallurgy is quite on the same footing; but certainly its association with the Institution of Mining Engineers is so close as almost to justify the term.

There is one paramount difficulty in dealing with the question that is particularly to the fore whenever amalgamation is mooted, and that is the fact that engineers are necessarily divided into separate classes, with entirely different interests, objects, and point of view. To take only the main division, there are the professional class, the scholastic and scientific, and the manufacturing and commercial; and amalgamation is only possible where there is complete unity not only in the ultimate object of each institution, but also in the sectional interests of the members.

Affiliation is in some ways a more nebulous form of amalgamation. It has for many years been pressed with great enthusiasm by some as the only statesmanlike course to be adopted, and probably most of you are aware that one of the oldest and largest engineering institutions laid certain proposals before your own institution some while ago. At that time nothing eventuated, and it was found impossible to find a *modus vivendi* or formula that would meet the views of all parties.

Joint Councils

The third means is the establishment of joint councils. At the present moment the only such council of whose working I can speak with any authority is the Engineering Joint Council. It has now been in existence nearly seven years, but it cannot be said that it has as yet obtained more than a very partial success. Membership in the first place has in practice been limited to the four founder Institutions, the Civil, Mechanical, and Electrical Engineers and the Naval Architects, with only one new addition in this period, and secondly the Council is definitely debarred from executive power or any initiative of discussion. It thus represents just those institutions most able to look after their own interests and can scarcely act except in strict accordance with their directions. It has so far as I am aware only secured one or two minor successes, but it is possible that its final position, if it were allowed to develop naturally, might be very different from that which it holds to-day. In saying this, I have, too, in mind what has already been done by the Empire Council of Mining and Metallurgical Institutions.

The grouping of kindred institutions into one building is obviously, apart altogether from other and wider considerations, a very sensible and profitable policy. It has been done in America, notably in the Engineering Building in New York, where all the important engineering institutions are housed together and share the library, information bureau, lecture halls and other facilities. But this arrangement owed its existence to the vision and generosity of a very wealthy man, and in the absence in this country of such benefactors, the financing of such a scheme has always been the main difficulty. We have here, too, other difficulties to overcome that are not so apparent in America. But you are aware that certain negotiations between your Council and a certain kindred society and another very large and important institution were carried on for some time with a view to our being given rooms for our purposes in their building. The scheme did not materialise, but we were agreed generally on principle.

Various comprehensive proposals have been put forward, though, so far, entirely without success. There is the finance question, but, in addition, the same difficulty that has always militated against the projected Chemistry House, which no doubt we shall some day see, is an almost insurmountable obstacle to any really large engineering scheme, namely, the reluctance of the old-established societies to leave their homes or share their position. I understand, however, there is at the present an important project on foot to unite the more important mining, fuel, and metallurgical institutions in one large building. The prospects seem distinctly fair, as the principle has been agreed to by all concerned. I sincerely

hope it will go through, for I can see nothing but good in the proposal. The value of such grouping is, I think, unquestionable.

The Position Abroad: United States

Let me now consider the position abroad. I have already referred to the Engineering Building in New York. There have been several other efforts in that country to co-ordinate engineering. The first I would mention is the American Engineering Council. This owed its origin, some six years ago, to the suggestion and support of the present President of the United States. It was formed with the object of "furthering the public welfare wherever technical and engineering knowledge and experience are involved, and to consider and act upon matters of common concern to the engineering and allied technical professions." Membership is open to all engineering and allied technical organisations, whether national, state, or local, "the constitutional requirements for membership in which are designed to maintain the high standing of the engineering and allied technical professions."

The Council, while to some extent it may have indirectly affected the attitude of the Federal and State Governments or of the various departments towards engineering, has in practice never been specially directed to that end. It has rather turned its attention almost entirely to general and fundamental research work. Some of its publications, more particularly the first volume dealing with the question of waste in engineering production, have been accepted as definite and valuable contributions towards the solution of various industrial problems. Engineering opinion, however, was for some time acutely divided as to the value of the work done by the Council, but latterly there seems to have been a growth of support, and the American Society of Civil Engineers which for long stood aloof, has, I understand, now decided to join.

The American outlook, however, with regard to such institutions is very different from our own. The whole executive power is generally concentrated in the hands of one official, whether he is president, director, or executive secretary. The success that can be secured by an exceptionally energetic and efficient director is undoubted. On the other hand, when the business of the institution is in the hands of an inefficient or unsuitable person, it is very likely to lose prestige very rapidly. Moreover, such American institutions generally owe their existence to the support of some wealthy industrialist, and when they require funds for research work they obtain them from the industries and businesses that may be expected to benefit. When this system is applied to professional institutions or councils formed of professional institutions, it certainly does not satisfy our views as to what is fitting.

Another direction in which engineering efforts have been co-ordinated in America is the Engineering Foundation, which was formed for the furtherance of research in science and engineering by the American Society of Civil Engineers, the Institution of Mining and Metallurgical Engineers, the Society of Mechanical Engineers, the Institution of Electrical Engineers, and the United Engineering Society. It has carried out some valuable research and experimental work.

Registration in America

One of the principal objects of co-ordination, namely, the improvement of the status of engineering, is in America secured, or at least attempted, very largely by the registration of engineers. Statutes directing either compulsory or voluntary registration of engineers exist in 25 out of the 48 States, practically the whole of this legislature having been enacted during the last twelve years. Action on similar lines has been taken in most of the provinces of Canada, and in Quebec the results have been that engineering is practically a closed corporation. The qualifications necessary for registration appear on paper at least to be high, but I think it is easy to see the many grave disadvantages that would or might be found to exist in any scheme of general registration, at least in this less bureaucratic country.

The compulsory registration of engineers exists also in Austria and is the principle of the foundation of the "Austrian Engineering Chamber," which is the body whereby the centralisation of engineering in Austria is effected. This is certainly the most determined and complete effort to co-ordinate engineering, and it is interesting to note that its origin dates back to an Imperial Law of the old Empire in 1913, revived by a Decree of 1918. At the outset the Chamber consisted of civil engineers, civil surveyors, and mining engineers, but I understand that it now includes mechanical, chemical, and electrical engineers and architects. Members are only admitted after completing regular technical courses and after a number of years' successful practice. Assistants or pupils in the employ of members are registered and in due course may become eligible for election. The rules appear to be very strict, allowing little latitude to the members of the Chamber in any professional question. Questions in dispute between members, or any complaint or claim against members in regard to their professional activities, other than actions for civil damages by outsiders, are compulsorily dealt with by the Chamber, and there is no appeal except to the Minister of Public Works. The whole administration and operations of the Chamber are subject to the supervision of the political head of the district, known as the Lieutenant-Governor, and from him there is no appeal except to the Minister of Public Works. It is compulsory on members to serve on the directorate if they are elected, and default in the payment of subscriptions renders the defaulter subject, according to the translation I have, to "political execution," a method that some of the harassed secretaries of our own institutions will envy. It is difficult to criticise an arrangement so entirely foreign to our views without knowing all the reasons which led to the establishment of the Chamber, and with but scant information of the results that have been obtained. It is, however, quite certain that nothing of that nature would be tolerated in this country.

Japan

Time prevents me from giving details of the efforts which have been made in many other foreign countries to tackle this grave problem, but in view of the forthcoming Engineering World Conference at Tokyo, I think it would not be out of place to give some details of that unique body, the Kogakkai, which is to act as host on that occasion. The Kogakkai is the original engineering institution in Japan. Intended, like our own Institution of Civil Engineers, to cover all engineering activities, it was threatened in course of time by the increase of specialising in engineering. In the first instance, it endeavoured to meet the demand by the establishment of branches or departments to cover the various interests. But in spite of this, institutions began to be formed to meet the requirements of mechanical, electrical, chemical, marine engineers, and so on; and members of the Kogakkai found themselves forced, if they were to keep abreast with the latest developments, to join whichever new societies dealt more particularly with their own special interests.

The position of the Kogakkai was thus much weakened, because in that frugal country engineers were reluctant to pay subscriptions to two societies. The difficulty was eventually solved by the Kogakkai some ten years ago closing its membership entirely, so far as individual members were concerned, and becoming an institution of twelve members composed of the twelve presidents for the time being of the twelve major societies.

The Kogakkai now acts as the nominal head and representative of engineering in Japan, whether in relations with the Government; in regard to any proposed legislation affecting the interests of engineering generally or individual societies; or, as in the present instance, in a social way. The personal opinion of such Japanese engineers as I have discussed the matter with seems to indicate that the influence of the Kogakkai is definitely waning, but it is probably too early to say what the ultimate development is likely to be.

General Conclusions

If now we are to sum up the results of these brief and scattered details for our own benefit, I would suggest that our first conclusion must be that there is no single solution of the problem. The lines on which action might most profitably be taken would seem to be:—

(1) The grouping of kindred societies, *pari passu* with the elimination by amalgamation of some of the weaker societies for whose separate existence there seems to be no justification. This grouping would not necessarily imply a physical grouping. The conjoint publication of proceedings of kindred societies, an excellent suggestion that has been put forward, might be one line of approach.

(2) The evolution by slow degrees of councils representing the major engineering societies and the several groups of societies, with eventually, perhaps, a general engineering council.

It is possible that some form of general co-ordination for research work alone could also be worked out without great difficulty. The good work done by the Conjoint Board of Scientific Societies, which was established during the war under the ægis of the Royal Society, justifies one in hoping that eventually, without having to wait for such an emergency, something on the same lines might be done by engineering institutions.

Co-operation in Science and Industry

Professor Thorpe's Presidential Address to the Chemical Society

At the annual general meeting of the Chemical Society, held at Leeds University on Thursday, March 21, Professor J. F. Thorpe delivered his presidential address, taking as his subject: "Co-operation in Science and Industry."

THE past ten years, said Professor Thorpe, had witnessed a wonderful development of organised industry and organised science in this country, and although conditions were still rapidly changing it was nevertheless possible to look forward and in some measure to determine the position in which they stood, and the prospects for the future. The war, although one of the greatest economic disasters the world had yet experienced, gave without question a stimulus to discovery and production which no other event could have occasioned.

It was a principle conceded now even by the enlightened leaders of labour that the universal demand for a higher standard of living necessitated a general increase in the national productive capacity, the term "productive capacity" being used to mean the capacity to render available the potential wealth of the nation in a suitable form. It was chiefly to the chemical and allied industries, mining, metallurgy, etc., that the country turned, because it was their peculiar function, aided by the engineer, to make available its mineral, vegetable, animal, and atmospheric wealth. The age was at hand in which the changing majorities of Governments would no longer be able to determine major policies as of war, financial and fiscal, except in directions approved by organised industry. Control by those who held the keys of national prosperity, that was, of organised industry, was one of the alternatives to class control, and was not only a desirable, but also an eminently practicable, ideal. To achieve it science and industry must organise so that they might become strong politically and financially.

Four Kinds of Co-operation

Four kinds of co-operation were essential to strength: (1) internal co-operation, (2) co-operation with pure science, (3) co-operation with Government, (4) co-operation with labour.

There were two immediate advantages to be gained by the formation of big combines, in the pooling of capital and the pooling of engineering resources; the establishment of a balance in commodities produced and in the method used for their production being determined mainly by chemical and engineering conditions. The chemist called upon the engineer for workmanship, design and material of the very highest class, and it was precisely in those directions that their engineering science excelled. This was particularly true of modern high-pressure processes, none of which was in existence till the end of the war. It was not too much to say that in that branch of chemical engineering Great Britain now led the world.

The standardisation of methods and the co-ordination of interests as regards production and distribution, the question of price and the prevention of over-production were problems which mainly concerned the business organisation of industry. Yet in some instances, especially in connection with the standardisation of methods, the help of the chemist was essential. The need for obtaining a balance in all these factors, a consummation which could only be reached by a pooling of like interests, was obvious. Probably the best example of the common use of a chemical substance by a number of different manufacturers was that of hydrogen, now used in vast quantities for the production of (*a*) methyl alcohol, (*b*) liquid fuels from coal, (*c*) ammonia, to mention three of its most recent applications.

Importance of Cheap Hydrogen

Professor Thorpe went on to discuss pressure reactions and the production of methyl and other alcohols by pressure and catalytic methods. Incidentally, with regard to certain reactions which were the subject of patent specifications in spite of the fact that it was doubtful whether they had ever been realised experimentally, he pointed out that the British patent system lent itself admirably to the production of "blocking" patents, and there was no subject so suitable as organic chemistry as a medium for such patents. The Bergius process and the synthesis of ammonia were then passed in rapid review.

All the processes mentioned needed cheap hydrogen. Fifteen per cent. of this was made by electrolysis, 70 per cent. by the water-gas catalytic method, and 12 per cent. from coke oven gas. The latter process would be more widely used in the future, and it might even be found economical to remove the hydrogen from the gas produced in gas works.

The moral underlying all this was that full industrial prosperity demanded still larger chemical combines and trade associations.

Co-operation with Pure Science

Chemical trade was expanding more rapidly than ever. There was a great demand for university-trained chemists, and the number of research chemists now employed in industry in this country was estimated as twenty times the pre-war number. Manufacturers realised that the necessary training for the men required must be fundamental. How was this to be attained? A four-year course was being gradually adopted.

Where the branch of science to be followed lay within the scope of general chemistry, specialisation in that particular branch should form the subject of the fourth-year course. That was undoubtedly the case with that important branch of organic chemistry which dealt with the intermediate products from the coal-tar hydrocarbons and the dyes derived from them.

Training for the Dye Industry

Not only had the far-sighted policy which led the Worshipful Company of Clothworkers to found what was now the Department of Colour Chemistry and Dyeing in the University of Leeds been fully justified, but the principles laid down and followed by each successive head of the department had served as a model which had been freely followed, both in this country and abroad. Each head of the department (J. J. Hummel, A. G. Green, A. G. Perkin, and F. M. Rowe) had considered it essential that students of colour chemistry and dyeing must be trained primarily as chemists in close co-operation with the pure chemistry, physics, mathematics, engineering, etc. departments, in which a large proportion of the students' time was spent.

Merely mechanical vocational training had never been provided, but the courses had been developed on an increasingly scientific basis in preparation for a career in any branch of industry in which the chemistry of colouring matters, of textile fibres, and of the processes to which they were submitted, played an important part. Actually, the training of a student of colour chemistry and dyeing was superimposed upon the normal preliminary training in the pure sciences, and was merely a continuation of the latter from the point of view of certain industries. The value and adaptability of this thorough and fundamental scientific and technical training was illustrated by the fact that at the end of his course a student might obtain a position as a chemist in such widely different branches of industry as the manufacture of intermediates and dyes, or of lake pigments, the distillation of tar, the manufacture of artificial silks or other cellulose products, calico printing, or the various specialised branches of bleaching and dyeing, including garment dyeing and cleaning.

Professor Thorpe said that he had thought it desirable to

give the above particulars of the Department of Colour Chemistry and Dyeing in the University of Leeds because they illustrated in a remarkable manner the way in which purely chemical and technical education had been combined to produce men thoroughly trained on both the fundamental and the practical side.

Process and Research Chemists

It was exceedingly difficult to determine whether any particular individual was more fitted to succeed as a process chemist or whether he had that peculiar aptitude which would enable him to carry out effective work in the research laboratory. It was always desirable to subject a student to one year's training in research after graduation in order to discover if he possessed the research characteristic. After one year's observation it was always possible to determine whether a man possessed (*a*) originality of thought and method such as would enable him to become a research originator, (*b*) the aptitude for research which would make him a good team worker under direction, (*c*) no aptitude for research of any kind. The term "research training" must be interpreted in its widest sense to include training in special branches of chemistry related to the industries as well as more general training in the higher branches of chemical technology.

In the past the great potentiality for research residing in our university laboratories, and in the personnel controlling them, was not available for industrial purposes. The fault lay mainly with our universities, which were loath to introduce science other than "pure" into their courses of instruction. The establishment of new universities in industrial centres soon produced a marked change, and research and instruction in the fundamental principles underlying industrial science gradually passed into the hands most competent to deal with them.

Co-operation with Government

The Government of this country had already discovered the two most valuable ways in which it could co-operate to the benefit of present and future chemical industry, namely (*a*) by protecting young and struggling industries against competition from similar but established industries abroad and against competition arising from deflated foreign currency, and (*b*) by promoting research in pure and applied chemistry by financial assistance. Professor Thorpe, dealing with the question of protection, discussed the Dyestuffs (Import Regulation) Act and the Safeguarding of Industries Act.

Government Promotion of Research

The establishment of the Department of Scientific and Industrial Research was next dealt with. The policy instituted by the department, by which research associations in various industries were founded on the basis of annual grants equivalent to the annual subscriptions of members of the associations, had led to the formation of twenty-four of these bodies. There could be no question that the experiment had proved a success and that the value of co-operative research in industry had been established.

Research Studentships and Fellowships

The establishment and award of research studentships and fellowships by the D.S.I.R. was originally rendered necessary in order that properly trained personnel should be available to meet the requirements of rapidly growing industry. Prior to the war research training was imparted only to a comparatively few students. The provision of students' maintenance allowances by the department had, therefore, enabled many men who would otherwise have had to pass into industry at the end of the three years' couse to stray at the university for one or two years longer, and in this way many students, fitted by temperament to make useful research workers, had been prevented from taking too early employment. This policy was undoubtedly in the national interest. It was therefore disquieting to realise that the policy of the department in connection with the provision of maintenance grants for students in training appeared to be changing, for whereas the number of such grants (including research workers and assistants) was 275 in 1925-26, it had fallen to 186 in 1927–28.

Every director of a research school had had to tell some promising student who wished to undergo post-graduate training, and who was, without question, likely to profit by such training, that no funds were available to enable him to extend his course, and that he must, therefore, seek any minor post that might be open to him. The loss of such a man was a national loss, because his training was broken off at the stage where even one extra year would have enabled him to become a useful member of a research organisation. It was therefore to be hoped that the diminution in the number of research grants was merely a temporary expedient, and that it did not indicate a reversal of a policy which had proved so fruitful.

Professor Thorpe was heartily thanked for his address and for his work during the past year, on the motion of Professor W. H. Perkin, seconded by Sir Robert Robertson.

The report of the Council was adopted at the annual business meeting held previously. The officers of the Society for the ensuing year are: Professor J. F. Thorpe, president; Dr. T. Slater Price, F.R.S., treasurer; Professor C. S. Gibson and Professor T. S. Moore, hon. secretaries; and Professor F. G. Donnan, F.R.S., foreign secretary.

The Annual Dinner

Following the general meeting, the anniversary dinner of the Chemical Society was held at the Leeds Town Hall. Professor Thorpe presided over a gathering numbering nearly three hundred which included Viscount Lascelles, Sir Robert Robertson, Col. C. H. Tetley (Pro-Chancellor of Leeds University), Dr. J. B. Baillie (Vice-Chancellor of Leeds University), Mr. C. S. Bedford, Professor Einaar Biilmann (president of the International Union of Pure and Applied Chemistry), Professor Max Bodenstein (Deutsche Chemische Gesellschaft), Col. H. D. Bousfield, Professor J. E. Coates, Professor J. W. Cobb, Professor J. B. Cohen, Professor F. G. Donnan, Mr. Cyril Eastman (president of the Society of Dyers and Colourists), Professor W. N. Haworth, Dr. T. A. Henry (vice-president), Mr. E. Hinks (president of the Society of Public Analysts), Mr. H. J. Dodsman, Professor C. K. Ingold, Professor B. Mouat Jones, Dr. J. Kenner, Mr. T. E. Lescher, Dr. H. Levinstein (chairman of the council of the Society of Chemical Industry), Professor D. McCandlish, Dr. H. McCombie, Mr. Emile S. Mond (vice-president), Professor K. J. P. Orton, Professor A. G. Perkin, Professor W. H. Perkin (past-president), Professor J. C. Philip (vice-president), Professor R. Robinson, Mr. W. R. Russell (sectional chairman of the Coke Oven Managers' Association), Mr. C. F. Tetley, Dr. H. T. Tizard (secretary of the Department of Scientific and Industrial Research), and Professor W. P. Wynne (past president).

Lord Lascelles' Toast

The toast of "The Chemical Society" was proposed by Lord Lascelles, who confessed that he had never felt much at home in the presence of great scientists and had always been very frightened of the chemist. On behalf of the West Riding he expressed pleasure in being in the midst of their great and important society, especially because he was confident that no portion of the country owed more to the activities of the science of chemistry. The West Riding was dependent upon the discoveries connected with the art of dyeing more than almost any other county, and the great achievements attained had been instrumental, if not in creating the prosperity of a large proportion of the county, at any rate in saving it from the worst periods of distress which had fallen upon other portions. In the happy connection between the Society and the University of Leeds there was a combination which he hoped in time would achieve even greater things than it had already done for the benefit of the West Riding.

The President, responding to the toast, said that chemists were not really a bad lot, but admitted that they were rather a queer lot. They suffered from one very great disadvantage —they were saddled with a name which was given by Act of Parliament to a totally different body of people who in other countries were called apothecaries and druggists. He did not think that the members of the Society were really competent to fulfil the functions of a druggist. (Laughter.)

The toast of "The City of Leeds" was proposed by Sir Robert Robertson, and responded to by the Lord Mayor. Professor H. B. Dixon proposed the toast of Leeds University, to which Dr. Baillie responded. Dr. Baillie said that, from some of his experiences at Leeds, he had come to the conclusion that the practical application of science was in many respects far more difficult than was the theoretical side.

The toast of the guests, proposed by Professor R. Whytlaw Gray, was responded to by Professor E. Biilmann (Denmark) and Professor Max Bodenstein (Germany), who both stressed the international nature of science, and of chemistry in particular.

Overseas Markets for British Chemicals

Opportunities for Trade and Development

In the matter that follows, collected and contributed from many sources, some idea is conveyed of the large opportunities still open for chemical export trade. In his recent plea for efficient salesmanship, the Prince of Wales emphasised the need of studying local conditions. The necessity for this is made clear in the notes on the characteristic features and conditions of the various countries dealt with and the special needs of their industries.

Resources of New Zealand

Likely Avenues of Development

The following notes on the chemical needs and resources of New Zealand have been compiled from official sources, and, so far as is possible in one article, give some indication of the competition to be faced in various directions. Opportunities for developing new domestic industries with native materials are not frequent in New Zealand, but likely avenues of development have been indicated.

THE chemical resources of New Zealand have not as yet been fully exploited, for although there are natural deposits of ores and minerals of various kinds, in many cases there is at present no process in existence which would make their working profitable. Sulphur is probably the most important material found. Native sulphur in sufficient quantity to be profitably worked occurs in the thermal districts of the North Island, near Rotorua and Lake Taupo, and at White Island. With the exception of the lake deposit on White Island, all the known native sulphur in payable quantity occurs in the form of pockets in pumice, or sinter around fumaroles or thermal springs (from which it has been sublimed in crystalline form), and as black sulphur. Sulphur is destined in the future to play an important part in the progress of the Dominion, and, recognizing this, the Government in 1922 completed the purchase of a large block of sulphur-bearing land in the North Island, which, when served by a railway, will constitute a most valuable asset.

Another attempt is being made to work the White Island sulphur deposits. Operations were commenced late in 1925, and comprised the testing and preparing for opencast working of the sulphur deposit, the provision of a safe anchorage and loading facilities for small craft at Crater Bay, and the building of accommodation for the men employed on the island. A small quantity of high-grade sulphur was shipped to Auckland, and liquefied out at 99·8 per cent. pure. Up to the end of 1926, 1,783 tons of crude sulphur had been shipped. The product, after treatment, was put on the market as a fertilizer. At present, most of the sulphur used, amounting to about 100,000 tons annually, is received from the United States.

Fertilisers as Dividend Payers

As far as fertilisers are concerned, the farmers have realised that the addition of fertilisers to the soil is a dividend payer, and considerable amounts are used, chiefly phosphates from Nauru and basic slag from Belgium. In 1926, imports of basic slag amounted in value to £48,856 from the United Kingdom, and £122,185 from Belgium, while in 1927 £33,441 worth were imported from this country, and £86,702 worth from Belgium. The Belgian material seems to be preferred as the British is stated to be too variable in quality. Chile nitrate is being increasingly used, and imports last year were valued at £25,557, compared with £13,199 in the previous year. Ammonium sulphate, chiefly from Australia, whence quantities valued at about £12,000 a year are imported, is not in such great demand. The United Kingdom contribution last year was appraised at £214, and the German at £57.

It is understood that representatives of Imperial Chemical Industries have, in the last few months, been travelling about lecturing on the new system of grassland management. Agencies of the constituent companies of I.C.I. were established in New Zealand before the amalgamation, and the results of other co-operation has yet to be seen.

As far as internal production goes, deposits of phosphate rock have been worked at Clarendon and Milburn. A limestone containing 10.6 per cent. of tricalcic phosphate occurs in the neighbourhood of Crewhero. Phosphatic minerals, the most common of which is hydrous iron phosphate, vivianite, have been discovered, but not in commercially important quantities.

Asbestos Deposits

There is a possibility of setting up an asbestos industry, as chrysotile-asbestos occurs in several localities in association with serpentine, and there are deposits of commercial importance in the Upper Lokaka district in Nelson. The district, however, is difficult of access, and until a path has been formed, the deposit cannot be profitably worked. According to tests in the Dominion Laboratory, the fibre varies up to 3 inches in length, is of excellent quality, and several tons of the fibre have been obtained and sold in London. New Zealand imports nearly £50,000 worth of goods containing asbestos as an essential constituent, as well as an amount of short fibre.

Large Quantities of Cement Materials

In a similar connection, New Zealand has enormous quantities of material suitable for the manufacture of high grade cement. The largest cement works are in North Auckland, where the principal ingredient is a soft argillaceous limestone. Large deposits of volcanic ash suitable for making pozzolana cement occur in the North Island, but although abundant do not appear to have been used at any time for this purpose. Cinnabar is widely distributed. During the years 1918–22, 16 tons 12 cwt. of mercury valued at £8,336 was exported. Several applications have been made to work the large deposits of iron sands which occur in New Zealand, but none has at present resulted in the establishment of any plant. The sands contain about 10 per cent. titanium oxide, and 60 per cent. iron. Among other mineral and chemical deposits are manganese ores, which have been extensively mined, scheelite, chromite, talc soapstone, magnetite, and various pigments useful for paints, and ores of precious metal.

New Zealand Imports of Chemicals

Chemicals are imported to New Zealand chiefly from British sources, the United Kingdom having a fair proportion of the trade. The following table shows the relative proportions of British and certain foreign imports into New Zealand in 1926 and 1927.

	1926 Value.	1927 Value.
	£	£
Acid—		
Acetic from U.K.	1,320	1,261
,, Canada	1,817	1,974
Citric ,, U.K.	3,831	2,992
,, Italy	990	877
Nitric Muriatic from U.K.	324	389
and fluoric ,, Foreign sources	1,036	1,480
Sulphuric ,, U.K.	1,470	821
,, Australia	1,546	1,618
Tartaric ,, U.K.	3,714	3,568
,, Italy	1,783	1,414
,, U.S.A.	6,542	5,373
Calcium carbide from Canada	8,571	9,374
,, Norway	3,705	2,480
Copper sulphate ,, U.K.	2,136	3,281
Cream of tartar ,, U.K.	34,631	35,499
,, foreign sources	19,436	30,632
Creosote ,, U.K.	242	299
Potassium cyanide from U.K.	16,550	17,934
,, foreign sources	559	491
Dyes—		
Crude from U.K.	102	48
,, British Empire	159	48
,, France	135	—
,, U.S.A.	24	58
Manufactured from U.K.	25,931	18,709
,, Germany	7,107	18,449
,, Switzerland	3,453	2,291
,, U.S.A.	4,471	3,408
Insulin from U.K.	671	838
,, France	1	—
,, U.S.A.	10	9
Naphthalene from U.K.	863	555
,, Germany	137	17
,, U.S.A.	102	—

			1926 Value. £	1927 Value. £
Caustic potash	,,	U.K.	228	115
	,,	Germany	328	254
	,,	U.S.A.	123	56
Saltpetre	,,	U.K.	1,949	2,240
	,,	foreign sources	662	525
Soda ash	,,	U.K.	21,928	18,941
	,,	U.S.A.	3,034	1,675
Sodium bicarbonate from U.K.			12,587	13,090
Caustic soda (in drums) from U.K. ..			15,570	14,541
	,,	foreign sources	901	545
,, ,, in cases	,,	U.K. ..	14,164	13,037

It will be seen in the above representative selection of statistics that, although a preponderating amount come from British sources, in some instances Germany is invading the market again, as in the manufactured dyes section. In fine chemicals also it is understood that competition is keen, German agents selling materials at prices far below cost, to gain the market and force others out. Some substances such as calcium carbide come solely from countries with an abundance of cheap electric power and not at all from purely merchanting nations. New Zealand has an abundance of water power, and it is understood that the erection of a hydro-electric plant for the production of cyanamide is under consideration.

Chemicals for South Africa

A Chance for British Exports

THE South African demand for chemicals and chemical preparations has substantially increased during recent years and this market offers a wide and growing field for United Kingdom manufacturers. Great Britain already enjoys a fairly satisfactory share of the import trade, but ample room exists for improvement in many directions at the expense of continental and American firms.

During 1927, the total imports of chemicals, drugs, and fertilisers into South Africa were valued at £2,578,390, of which Great Britain supplied goods to the value of £1,088,006. All classes of chemicals are in heavy demand, but the most important are sodium cyanide, crude glycerin and distilled glycerin, in bulk. Imports of these chemicals into South Africa during 1927 amounted to 10,529,897 lbs., 4,793,619 lbs., and 4,288,869 lbs. respectively, the United Kingdom contributing 2,565,042 lbs., 1,117,887 lbs., and 2,135,850 lbs. The trade in druggists' sundries has shown some falling off during latter years, although the import business is still important and was worth £89,678 in 1927. Of this total £63,571 represented Great Britain's share, whilst imports from Germany were valued at £7,414. It should be noted, however, that German manufacturers are annually increasing their sales of druggists' sundries in this market. Imports of medicinal preparations, which were valued at £219,083 in 1927, have shown a steady increase during recent years. The United Kingdom controls about 70 per cent. of this trade, the remainder being shared between the U.S.A., which enjoys about 21 per cent., and Germany with roughly 5 per cent. of the business. Great Britain is also the largest supplier of drugs, imports from the United Kingdom in 1927 amounting in value to £88,233, which represents 71 per cent. of the total trade. Germany, who is rapidly expanding her business in this direction, supplied goods to a value of £20,702. The demand for toilet preparations and perfumery is considerable and has largely expanded during recent years. In 1927 imports were valued at £243,600 compared with £171,499 in 1923. The chief competing countries in this branch of the trade are Great Britain, U.S.A., France and Germany, the shares enjoyed by these countries being 59·77 per cent., 22·43 per cent., 15·56 per cent., and 1·91 per cent. respectively.

Fertilisers and Paints

Great Britain's trade in fertilisers is very small, only 9·6 per cent. of the business in 1927 being in the hands of United Kingdom firms. Considering that imports, which in that year were valued at £408,721, are rapidly increasing, some effort should immediately be made by British manufacturers to secure a larger share of the trade.

The local soap industry is capable of supplying the bulk of the demand for common household, soft and toilet soaps, but the import trade nevertheless remains of some importance. During 1927, imports amounted in value to £110,140, of which £42,516 represented Great Britain's share. The U.S.A., France and Germany are the principal competitors in this direction. With regard to candles, the domestic industry is also able to meet most of the demand, although good business in the better qualities is possible. Linseed oil is almost entirely obtained from the United Kingdom. There has also been a steady growth of British trade in lubricating oil, and further progress in this connection should be possible.

Paints and Colours

There is an important domestic production of paints and colours, but the import trade remains one of considerable value, external purchases being worth £371,650 in 1927. Seventy-one per cent. of the business is in British hands, while the U.S.A., which is the most serious competitor, controls roughly 17 per cent. America enjoys the bulk of the business in distempers and colour washes, whilst white lead in oil is obtained in important quantities from Holland. The demand for varnishes and stains is comparatively small, imports being valued at nearly £50,000. The market is increasing, however, and British manufacturers should make every effort to improve their position. Continental and American firms between them control over £12,000 worth of the trade. Blacking, boot and other polishes are almost entirely supplied by the United Kingdom, and competition from foreign sources is negligible. In many instances the expansion of Great Britain's trade is possible and the adoption of more efficient trading methods should enable this to be achieved. The appointment of competent agents is essential whilst the question of personal visits to the market should receive careful consideration. It is also important that prices should be kept as low as possible.

Hungary as a Chemical Market

ALTHOUGH the market for chemicals in Hungary is not particularly extensive, imports are large enough to merit the careful attention of British manufacturers. The domestic industry is well developed and is able to satisfy requirements in certain cases, but in many other directions supplies are obtained from external sources, while the raw materials required are also mainly imported.

During 1927 exports of chemicals and chemical preparations from Great Britain to Hungary were as follows :—

	QUANTITY. Quintals.	VALUE. Pengos.
Fine chemicals and their raw materials	205	88,559
Acids, salts, gases, artificial manures, etc.	1,584	85,718
Coal tar, asphalt, mineral oil, and products thereof	15,939	376,493
Fats, oils, waxes, resins, and products thereof	11,459	1,196,055
Tanning materials, dyestuffs, and colours	1,051	85,784
Essential oils, scented and aromatic substances	82	144,695

The local production of fertilisers is mainly confined to superphosphate, although there is also a small output of ammonium sulphate. During the first nine months of 1927 131,000 tons of superphosphate were manufactured in the country compared with 76,000 tons in 1926. These figures reflect the increasing use of fertilisers by the farmers generally. Thomas slag is imported, and here again the demand is growing. Purchases made during the first nine months of 1927 amounted to 2,660 tons, which is roughly the amount imported during the whole of 1926 and double the quantity used in 1925. A considerable increase in the use of nitrogenous fertilisers is also noticeable, imports of calcium cyanamide up to September, 1927, amounting to 3,510 tons, as against 2,010 tons in 1926, while 1,550 tons of Chile nitrate were imported during the same period in 1927, compared with 1,010 tons in 1926. The consumption of ammonium sulphate during the above periods was 2,330 tons and 1,560 tons respectively. Owing to the satisfactory results obtained by the use of these products a further substantial increase in the demand is anticipated. The use of potash fertilisers is not increasing, however, and the consumption of these preparations remains stationary at about 3,000 tons per annum. In addition to the above, bone phosphates, bone ash and animal charcoal are largely required, the latter being used by sugar refiners.

There is a large market for insecticides, and although these are manufactured locally to some extent, considerable quantities are also supplied by Germany. Copper sulphate, of which about 2,000 tons are imported annually, is mainly obtained from Italy. This product is extensively used in the vineyards.

Chemicals for Textiles

Almost every branch of the textile industry is well represented in Hungary, and the demand for dyes and dyestuffs is therefore large. All requirements have to be imported, the chief supplier being Germany. Competition from that source is very keen, but United Kingdom manufacturers should, with endeavour, capture a larger share of the trade. The local tanning industry is also responsible for a good call for tanning extracts. Candles, soaps, cosmetics, pharmaceutical and medicinal preparations, paints, varnishes and lacquers are manufactured locally, but domestic concerns are unable to supply the whole of the market's needs, and in these directions also good scope exists for increased British business.

British representation in Hungary is fairly satisfactory, although more frequent personal visits might be undertaken with advantage. This procedure, in addition to being appreciated by importers, would enable a first-hand knowledge of the market to be acquired.

Openings in Lithuania

LITHUANIA is another market which, although limited, is worthy of attention by United Kingdom chemical manufacturers.

The total imports of chemicals and chemical preparations into this market during 1926 and 1927 amounted to :—

	1926.		1927.	
	QUANTITY. Metric tons.	VALUE 1,000 Lits.	QUANTITY Metric tons.	VALUE 1,000 Lits.
Chemical and pharmaceutical products	245·3	1,381·1	381·7	1,397·8
Medicinal and pharmaceutical preparations	36·4	979·1	36·8	1,061
Superphosphates and other fertilisers	61,949·3	9,408·3	81,314·2	12,235·9
Perfumery and cosmetics	5·2	154·8	5·8	210·7
Soaps and candles	44·9	140	15·5	74·3
Paints and varnishes ..	362·7	1,273·3	468·9	1,739·8

With the exception of soaps and candles it will be noted that imports increased during 1927 in every direction, a fact which augurs well for the future. British exports to this market are relatively small, and relate mainly to bicarbonate of soda, although a certain share of the trade in fine chemicals and pharmaceutical preparations is also in the hands of United Kingdom firms. These latter products and also heavy chemicals and acids are, however, chiefly supplied by Germany. Medicinal preparations, which have to be submitted to the Department of Health for inclusion in the list of authorised imports, are in good demand and are purchased mainly from German firms.

Lithuania is essentially an agricultural country, and the market for all kinds of fertilisers and insecticides is therefore good. An excellent opening exists in this branch of the trade for enterprising British firms. The demand for imported soaps and toilet preparations is not very large, requirements being mainly satisfied by local products, whilst paints and varnishes are obtained from Germany at very keen prices.

As in the case of Hungary, a personal visit to the market should prove the best means of forming new connections and of stimulating business generally.

Netherlands East Indies

THE consumption of chemicals and chemical preparations in the Netherlands East Indies has shown considerable expansion during recent years, and the market promises to become increasingly valuable. Both fine and heavy chemicals are in request, and there is a particularly good demand for fertilisers, insecticides, drugs, medicinal and pharmaceutical preparations, polishes, dyestuffs, and paints, supplies of which are almost entirely obtained from foreign sources. Great Britain only enjoys a comparatively small share of the available business, and although competition from Germany and the United States is very keen, efforts might well be made to secure a stronger foothold in the market.

Figures relating to the importation of chemicals and chemical preparations into Java from Great Britain during 1925/6, which are tabulated below, indicate that, with the exception of sodium compounds, trade was lost in every direction during the latter year.

	1925.	1926.
	Tons.	Tons.
Sulphate of Ammonium	26,674	19,680
	Cwt.	Cwt.
Sodium Compounds.....	125,188	150,584
Proprietary Medicines	£13,862	£12,092
	Cwt.	Cwt.
Painters' Colours and Materials	11,626	8,584

Apart from chemical fertilisers and insecticides, the most important chemicals required include alum, calcium carbide, caustic soda, coal tar, carbonate of soda, sulphur, copper sulphate and iron sulphate. There is also a heavy demand for acetic, formic, citric, hydrochloric and sulphuric acids, chloroform, sodium cyanide, formaldehyde and photographic chemicals. Calcium chloride is used extensively for the manufacture of ice, whilst anhydrous calcium chloride is required for use in laboratories and for the manufacture of quinine from cinchona bark. Potassium nitrate for preserving meat and the manufacture of explosives, and hematite for making up paints, are also imported in fair quantities.

Supplies of the above chemicals are chiefly obtained from Germany, exports from the United Kingdom being small except in the case of carbonate of soda, caustic soda and alum. America also supplies large quantities of caustic soda, whilst Holland is a very keen competitor in acids.

Fertilisers and Insecticides

In view of the steady expansion of the tea, rubber and tobacco plantations, the demand for chemical fertilisers and insecticides, which is normally very extensive, has naturally increased, and excellent prospects are offered in this direction to British manufacturers. Sulphate of ammonia is the main fertiliser required, the chief suppliers being Germany, America, and the United Kingdom. Composite fertilisers, phosphate, and superphosphates, which are also imported in exceedingly large quantities, are chiefly obtained from Holland and Belgium, while liquid ammonia, nitrate of soda, Chile saltpetre and basic slag are other artificial manures in considerable request. With regard to insecticides, the most important are arsenate of lead and paris green, which are chiefly used in the tobacco plantations. Here again, German firms control the bulk of the business, although the United Kingdom enjoys a fair amount of the trade in arsenate of lead. Holland and Italy are also competitors for this business. The local batik industry is responsible for an important demand for dyes. Germany, who before the war controlled this business, has to a large extent regained her former position, although it is encouraging to note that Great Britain now exports fair quantities of Alizarine Blue. Aniline dyes and synthetic indigo, which are the other chief colours required, are however, only obtained in very small quantities from the United Kingdom. It should be possible for British firms to compete more effectively in this trade.

The market for painters' colours and materials is increasing, and the importation of red lead, varnish, zinc white, turpentine, liquid paints in tins of 1, 2 and 5 kgs., and dry paints, now reaches large dimensions. Germany and Holland are the principal suppliers, followed by Great Britain.

Sales of pharmaceutical and medicinal preparations are also important. Germany controls a large proportion of the business, although it is considered that United Kingdom products would meet with much greater success if a reasonable amount of advertising were undertaken.

While foreign competitive manufacturers owe much of their success to lower prices, their active cultivation of the market has also been an important contributory factor. British manufacturers are therefore urged to study requirements in greater detail. Efficient representation is also essential, and efforts should be made to establish satisfactory connections with importers and estate agents.

Chemical Industry and Trade in Japan

Economic Conditions Trying, but Production Increasing

SOME interesting side-lights on the economic stability of Japan, and of the state of her chemical trade and industry are given in the *Report on Economic Conditions in Japan* (H.M. Stationery Office, pp. 100, 3s.), which is issued by the Department of Overseas Trade.

In an introductory note on the economic progress of Japan in the last 60 years the authors state that Japan has been obliged to attempt to compress into a few decades an economic development which most other industrialised countries have spread over at least a century. Where the prime essentials are energy and technical knowledge she has made rapid progress, as is evident to anybody who compares the volume and range of her manufactures to-day and 20 years ago. But where advance depends not only upon the skill and knowledge of the leaders, but also upon such impohderable elements as the commercial and financial experience of the community as a whole, success has not been so uniform, and this is only too plainly apparent from the series of financial upheavals which have marked the period from 1920 to the present day.

Internal Production of Chemicals

The chemical industry has made striking advances in output, and to-day produces a number of products which a few years ago were not manufactured at all or manufactured in negligible quantities, as the following figures show :—

	1914.	1926.
	(Million lbs.)	
Sulphuric acid	252	1,049
Hydrochloric acid	8	40
Nitric acid	1	17
Sodium sulphate	5½	60
Sodium sulphide	—	24
Soda ash	½	38
Caustic soda	10	56
Aluminium sulphate	—	35
Acetic acid	2	10

In this category may be included chemical fertilisers, such as sulphate of ammonia (39 million kwan produced in 1926 as against 10 million in 1916), and superphosphate of lime (209 million kwan produced in 1926, as against 112 million in 1916).

As far as regards the economic position at May, 1928, perhaps the chief difficulty caused by the bank failures was the loss of credit facilities by small traders and manufacturers who play a very important part in Japan. They cannot resume their full activities until they can obtain easy accomodation, and consequently an all round recovery cannot be expected until the local banks are in a position to make advances or until some other means of financing small enterprises are devised. It is interesting to note, however, that the financial crisis of 1927 has probably accelerated in Japan the rationalisation of industry. While the resumption of full industrial activity is delayed because of the difficulties which chiefly affect small manufacturers and dealers, restrictions of output were in force in most of the major industries during 1927, and in most cases have not been withdrawn. Chemical fertiliser plants, for instance, were closed for one month at the end of 1927, and output was reduced by 20 per cent.

Chemicals and Fertilisers Imported

The principal chemicals imported in 1927, in millions of yen, were, ammonium sulphate, crude, 32·75 ; nitrate of soda, crude, 6·75 ; soda ash and natural soda, 6·54 ; caustic soda crude, 5·69 ; sulphate of potash, crude, 4·24 ; glycerin, 1·86. Apart from heavy chemicals, the main interest of the import of chemicals into Japan is in relation to the manufacture and supply of fertilisers—a question of vital importance to Japan, in view of the intensive methods of cultivation employed. Fertilisers imported from 1922 to 1927 increased from 1·72 million tons to 2·12 million tons. After bean cake the principal import is ammonia sulphate, which has risen from 92,000 tons in 1922 to 293,000 tons in 1926. The chief sources of supply of ammonium sulphate in 1927 were as follows : from Germany, 135,429 tons ; from Great Britain, 60,103 tons ; from United States, 40,417 tons.

The increased demand for this fertiliser has produced interesting results. In 1923, when the total import was less than 150,000 tons, the chief suppliers were the United States and Great Britain. In subsequent years, Germany entered the market with synthetic sulphate, and in 1926, when the import was nearly 300,000 tons, the proportions were roughly, Germany 60 per cent., United States 22 per cent., Great Britain 13 per cent. In 1927, however, Great Britain's position improved, and imports of German sulphate fell off. Severe competition is, therefore, to be expected in future between the British by-product and the German synthetic product. Meanwhile, strong efforts are being made to increase the production of ammonium sulphate in Japan itself. 146,000 tons were produced in 1926, and the 1927 production is estimated at 180,000 tons ; but the total requirement will, it is stated, soon exceed 500,000 tons per annum. The chief steps now being taken to increase the domestic production of ammonium sulphate are the erection and extension of nitrogen fixation plants. Further progress depends largely upon the success of the Japan Nitrogen (Dippon Chisso) Co.'s works in Korea. This company is now building large water power stations (120,000 kilowatts) for a synthetic ammonia plant capable of producing 250,000 tons of sulphate per annum. Production will be by the Casale system, already adopted by the same company for its plant in Japan, which has an annual capacity of 50,000 tons of sulphate.

The production for fertilising purposes of superphosphates from imported rock phosphates, is another important industry. The total production of superphosphates in Japan during 1927 was 752,889 tons.

The extensive appendices to the report deal with Korea and Formosa. In the section dealing with Formosa it is stated that camphor shipments show signs of recovery in 1928. The commodity is no longer the asset it was to the Monopoly Bureau owing to the enforced reduction of prices to permit of competition with the German synthetic product. As far as concerns Korea, practically all the soda ash is British, imported via Japan. Sodium and potassium cyanides are imported for the use of the gold mines. Roughly two-thirds of this import is British, and the balance American.

Italy, Portugal, and Turkey

Notes on Market Conditions

THREE recent annual reports on economic conditions in foreign countries, issued by the Department of the Overseas Trade, and published by H.M. Stationery Office, relate to Italy (pp. 128, 3s. 6d.), Portugal (pp. 52, 1s. 6d.), and Turkey (pp. 31, 1s.).

In the report on Italy the compilers, Mr. E. C. Donaldson Rawlins and Mr. H. C. A. Carpenter, state that throughout the first eight months of 1927, the most damaging factor, and that which gave rise to the most preoccupation, was the uncertainty in the exchange and the continuous rise in the value of the lira. Luckily, relief came in time and the Government stepped in with the announcement that the exchange was to be held at around 90 to the £1. There was no official stabilisation as yet, but it became clear that no more violent fluctuations in the rate of the exchange would be tolerated. The campaign to intensify production and to buy national manufactures has not slackened one whit and every effort appears to be directed toward the protection, support and advancement of home industries. In a note on the imports of chemical and pharmaceutical products it is stated that during the first six months of 1927 this trade did very well, especially preparations from France, which are extensively advertised in the local press. German trade is mainly in chemical products, *i.e.*, ingredients that are used in making up pharmaceutical preparations. Whilst the British share in this trade has been small as regards volume, it has been large proportionally as regards value, on account of the expensive nature of the goods imported. The new regulations (*Norme per la Produzione ed il Commercio di Specialità Medicinali*) which became operative on May 1, 1928, provide for a first tax of 1,000 lire on every pharmaceutical preparation and thereafter an annual tax of 500 lire. Moreover every preparation must be registered with full detail as to its formula. In this way it is hoped to purify the Italian market from the many quack medicines which are now on sale. On account of an old convention, British products will not be affected by these regulations. In the fertiliser market the following values are given for the imports in 1927 (in millions of lire) : Mineral phosphates, 77·6 ; sodium nitrate,

58·2; ammonium sulphate, 15·7; calcium cyanamide, 19·5; potassic fertiliser, 17·8; and other chemical fertilisers, 40·0.

Internal Production

As far as concerns internal production, many branches of the chemical industries, being dependent on the welfare of others (such as agriculture, textiles, paper, leather, metallurgical, engineering, glass, building, etc.), have suffered from the general depression. The home consumption of inorganic acids, superphosphates, caustic soda, chloride, tanning extracts, paints and colours, has been considerably contracted in comparison with 1926. The use of chemical manures in agriculture has diminished by 50 per cent., possibly because the farmer could not afford to pay for more. There has, however, been a slight revival in a few branches in consequence of an improved outlook in the paper and textile trades, but competition has been felt in paints and varnishes from American imported goods. The export of tanning materials has been normal. The dyestuff factories are developing their organisation to cover the needs of the home market and to enter the export trade. The Bonelli Dye Works (capital 60 million lire), the Italian Explosives Co. (S.I.P.E., capital 30 million), the Italica Dyestuffs Co., and the Sciapparelli Pharmaceutical Co., have combined under a common directorate to cover the full cycle of products obtained from tar. Only a few branches of the industry can show satisfactory results. Match factories have done about as well as in 1926. Mineral oil industries have done a little better. The soap industry is also one of the few that have had a profitable year. Some that have followed the general rule and done badly are the tartaric and citric acid industries, and pharmaceutical industry. The sulphur mines on the mainland are said to be doing well, but the Sicilian industry is passing through a bad time. The production of bauxite was 90,000 tons, about the same as in 1926 but much less than in 1925 (195,000). Large works are being constructed by the Montecatini Co., at Marghera (Venice) to produce alumina from bauxite. A hydro-electric plant at Mori (Rovereto), producing 120 million k.w.h., is nearing completion. In conclusion, the report contains very detailed statistics of exports and imports.

Portugal and Turkey

In Portugal imports of British chemicals increased satisfactorily in 1925 and 1926. Apart from sulphate of copper, which alone reached a value of nearly £59,000 in 1925 and £67,000 in 1926, other chemical products amounted to approximately £78,000 in both 1925 and 1926. A large increase of from £160,000 to £240,000 approximately, was registered in the value of the imports of phosphates and chemical manures between 1925 and 1926. Medicines and drugs were imported to a value of approximately £80,000 in 1925 and £85,000 in 1926, to some extent from the United Kingdom, but principally from Germany and France. As far as exports are concerned the British-owned San Domingo mine exported some 170,000 tons of pyrites in 1926 and 211,000 tons in 1927. Salt exports are increasing after a serious falling away.

Turkey is chiefly an importing country and the report for this country points out that difficulties have been experienced by foreign manufacturers of pharmaceutical preparations and proprietary medicines in regard to the regulations governing the import of these to Turkey. According to the regulations in force the importation into Turkey is prohibited unless a special import permit has been issued by the Turkish Ministry of Health, and in order to obtain this permit it has been necessary to send to the Ministry five samples of the preparation in question for purposes of analysis. But this has proved virtually impossible in practice, for the simple reason that the Customs have refused to release preparations on the grounds that their entry into the country is prohibited. As the result of representations, the entry into Turkey of samples of pharmaceutical preparations and proprietary medicines is now authorised, provided samples are addressed direct to the Ministry of Health in Angora. In general, the tendency to nationalism, the general effect of which is to discourage foreign enterprise, has again been apparent in Turkish commercial and economic legislation. The replacement of the old established trading element by a body of Turkish traders which has not yet gained experience is a process which needs time to ensure successful fulfilment.

Fertiliser Industry in Irish Free State

Census of Production Report

THE fifth of the series of Preliminary Reports on the Census of Production taken in the Irish Free State in 1926 deals with the fertiliser industry. Returns were received relating to the operations in 11 establishments at which fertilisers were made in that year.

Gross Output: By-Products

The following table shows the quantities and net selling values of the products made in 1926 for sale by these 11 establishments.

KIND OF GOODS MADE AND WORK DONE.	QUANTITIES	NET SELLING VALUE.
	Tons.	£
Super-phosphate	71,321	212,084
Bone meal	1,598	8,559
Tankage	711	3,380
Compound manures	44,660	266,332
Sulphuric acid	3,856	9,184
All other products	—	41,918
Work done on commission—		
Amount received	—	144
Total value of goods made and work done	—	541,601

Practically all the fertilisers made in the Free State are used in the country. Exports are small, and in 1926 were valued at £19,053. In considering the total output of fertilisers, account has to be taken of the quantities of sulphate of ammonia which are produced as a by-product in the making of gas. The returns received from gasworks undertakings in respect of the year 1926 show items of sulphate of ammonia amounting to 1,267 tons with a net selling value of £11,676. One of the concerns engaged in the manufacture of fertilisers returned the value of glue and grease made by them, which, amounting to £23,231, has been included in the above-mentioned figures of output of "all other products."

Materials Used and Cost

The total cost of ingredients used in making the 1926 output was £300,428, which included £90,854 for rock phosphate (60,939 tons); £87,453 for sulphate of ammonia (7,796 tons); £35,655 for iron pyrites—sulphur content only—(27,224 tons); £22,586 for potash (5,199 tons); £19,560 for raw guano (1,850 tons), and £17,022 for bones (2,999 tons).

The cost at works of the fuel, purchased electricity, oils, etc., used for heating, lighting, transport, driving engines, etc., was £20,044, of which coal (7,485 tons) accounted for £14,518 and electricity (388,185 B.O.T. units) for £3,579. The estimated cost of purchased sacks, bags, cases, etc., sold with the output, the cost of replacing tools and the cost of materials for repairs to buildings or plant, executed by the firm's own workpeople, was £57,125.

Net Output

It is now possible to calculate the net output of the fertiliser industry in the Free State in 1926, thus:—

	£	£
I. Gross output		541,601
II. Costs:		
Ingredients	300,428	
Fuel, etc.	20,044	377,597
Purchased sacks, bags, cases, etc.	57,125	
Net output (I *minus* II)		164,004

The amounts paid in salaries and wages in 1926 by the 11 firms in connection with the output of fertilisers was £33,128 and £111,310 respectively, a total of £144,438. The number of persons engaged in the establishments on October 16, 1926, was 766, of whom 144 were clerks and salaried employees, and the remaining 652 wage earners. Only 65 females were employed in the industry, and of these 29 were among the clerks and salaried employees. A table in the report shows that the manufacture of fertilisers is a seasonal industry, large numbers of works being employed in the five months period January-May inclusive. The number of hours worked were, on the average, 48 per week, except in the case of workers engaged on sulphuric acid production, where the hours were 56 per week. The effective horse-power of prime movers was 2,086 (reciprocating steam engines 1,186), the rated horse power of electric motors (exclusive of converters or transformers), was 655, and the kilowatt capacity of electric generators was 455.

Chemical Research in India

[From Our Indian Correspondent.]

The value of chemical research is now firmly established in India and, as far as the country's finances permit, good progress is being made. First and foremost of the research institutes may be mentioned the Forest Research Institute at Dehra Dun. The sections of this institute whose work bears most directly on industry are those dealing with timber testing, seasoning, wood preservation, and paper pulp. The work done on the testing, seasoning, and preservation of timbers is directed towards securing Indian timbers which will supply various needs in industry. Thus a large amount of work has been done on railway sleepers. Various woods have been subjected to tests, to kiln seasoning, and to antiseptic treatment, and results of great value to Indian railways have been secured. The North-Western Railway, for example, has established a creosoting plant, capable of treating 400,000 broad gauge sleepers annually. The timber treated had not been used for sleepers before, being formerly marketed only with difficulty. Rifle-stock wood, which was formerly imported from America, is now, as a result of researches at Dehra Dun, entirely supplied from the North-West Frontier Province and Kashmir, and important results have been achieved in the substitution of kiln seasoning for air seasoning, at a great saving of cost.

Manufacture of Paper Pulp

In the paper pulp section, the factory plant erected in 1924 is now capable of producing eight tons of paper weekly. The earlier work in this direction eliminated a large number of unsuitable materials, and has enabled efforts to be concentrated on a limited number of grasses, etc., including bamboo. Among recent important results is the evolution of a method which greatly reduces the cost of bleaching bamboo and sabai fibre, and gives a gain in the yield of pulp. Much of the activity of the paper pulp section is devoted to the examination of forest areas regarded as suitable for exploitation by the industry. Several areas have been thoroughly examined and reported upon, with the result that concessions have been taken up; and the investigations into the bamboo pulp were largely responsible for the erection, near Calcutta, of a mill using this material.

Tanning and Leather

The Bengal Tanning Institute shows very good progress. In the laboratory of this institute, attention has been given to the testing of old and new tanning materials, and to the analyses of waters used in various tanneries, and results of practical importance have been obtained from extensive researches into the effect of neutral salts on the basicity of chrome liquor. A method has been successfully worked out for the production of superior sole leather from buffalo hides, and the introduction of suitable processes for tanning lizard skins, and for manufacturing glacé kid from local goatskins, has led to the adoption of new branches of the leather industry in Bengal.

The Leather Trades Institute in Madras has done work on the fermentation of tan liquors and on a number of tanning materials. In the tannery successful experiments were made on the use of wattle bark in substitution for the more costly avaram, and the possibility has been established of obtaining suitable sole leather by retanning dhori hides (a porous bag-tanned leather).

Miscellaneous Work

A number of isolated investigations of more or less importance were carried out in the various provinces. In Bihar and Orissa, the study of "khari" was undertaken. Khari is an efflorescence consisting of sodium sulphate and magnesium sulphate, and the investigations were directed mainly to ascertaining the possibilities of producing sodium sulphate on a scale which would make the manufacture of sodium carbonate a commercial proposition. In Bombay, some attention was given to a study of the bitterns of Kharagoda, to Sind soda (trona), and to researches in connection with casein. In Madras, a considerable amount of research has been done in connection with inks, soap, glycerine, and glue. In Bengal, investigations have been made in connection with the match industry, including experiments on the bleaching of gengwa wood, on match-head composition and on the damp-proofing of matches. Work in Madras included investigations into the utilisation of limes as a source of citric acid, the extraction of tartaric acid from tamarins, and the manufacture of sodium carbonate from certain alkaline deposits.

Chemical Trade with the Argentine

An Official Review

The Department of Overseas Trade has issued a report by Mr. H. O. Chalkley on the "Commercial, Economic and Financial Conditions in the Argentine Republic, October, 1928" (H.M. Stationery Office, pp. 108, 3s.). With regard to chemical products, it is stated that the large Argentine demand for heavy chemicals is maintained, but that local buyers are thoroughly familiar with competitive prices from different countries and manufacturers, and place their orders accordingly. Commercial grades of sulphuric, muriatic and nitric acid are produced by local factories, and other acids mostly come from Germany, although Italy supplies almost all the citric acid and about 70 per cent. of the tartaric acid.

The trade in caustic soda is divided between Great Britain and the United States, and that in soda silicate and sodium sulphide between Great Britain and Germany, the trade in soda ash being British. The large importation of sulphate of alumina is mainly from Germany with occasional parcels from France, prices from these sources being consistently lower than British. Other sections of the trade in which Germany predominates are anhydrous and liquid ammonia, calcium chloride, bleaching powder, match chemicals and paint chemicals. The importation of nitrate of soda is from Chile or from reshipments of Chile nitrate from Europe.

In the list of importers of chemicals and allied products into the Argentine, the United Kingdom heads the list in sheep dips, soap, sodium carbonate, and paints. The total real value of imported chemicals and drugs was 31,934,383 gold pesos in 1926, and 30,229,551 gold pesos in 1927.

Argentine Products

Among interesting products of the Argentine are various vegetable oils, including peanut, rape, cotton, linseed, spurge, sunflower, olive and maize oil.

In the northern provinces of Argentina there are some 23 factories engaged in the production of quebracho extract, the most effective and concentrated tanning agent known to the leather industry. A British company, the Forestal Land, Timber and Railways Co., accounts for half of the production. The quebracho trees used in the industry are calculated to be at least 100 years old, so that the raw material available is being gradually exhausted. The industry has been in existence about 30 years, and it is calculated that the supply of timber is now approximately sufficient to maintain production on its present scale for another 30. The exports for 1927 were 198,807 tons of extract, valued at £3,814,000, and 129,104 tons of logs, valued at £510,000. Germany and the United States are the largest buyers of extract and the United States, France, Belgium and Germany of the logs.

Canada's Record Mineral Production

The increasingly important part that Canada is playing in world mineral production is illustrated by the 1928 figures just issued. A new record was set up in 1926, and another in 1927, but the 1928 output far surpasses even these years, being no less than 10·5 per cent. above 1927. New output records were established under the following heads:—Copper, cadmium, gold, lead, nickel, platinum group of metals, zinc, cement, coal, gypsum, petroleum. The year's production may be summarised as follows:—Metals, 131,904,000 dollars; increase 16·2 per cent.; fuels, nearly 73,000,000 dollars, increase 2·2 per cent.; other metals, 18,664,000 dollars, increase 6·3 per cent; clay products and other structural materials, 49,882,000 dollars, increase 11·3 per cent. Total output, 273,446,000 dollars, increase 10·5 per cent. The report says that Canada, which is the world's fourth most important producer of copper, has every prospect of becoming the third greatest source of this metal within the next ten years. Nickel production totalled 96,755,000 lb. valued at 22,318,000 dollars, a new high production record, surpassing even the wartime figures, and an increase of 44·8 per cent. in quantity and 46·2 per cent in value over 1927.

Chemical Research at King's College, London

A Striking Record of Work

The following notes on the original work done by members of the Department of Chemistry in King's College, London, with special reference to its industrial applications, are a remarkable testimony to the ability of the men who have worked in the Department.

KING'S COLLEGE was fortunate in its first professor of chemistry. That great man, J. F. Daniell, who was appointed to the chair in 1831, not only made far-reaching discoveries but also showed himself a practical and businesslike inventor of apparatus which to this day keeps his name familiar to scientific workers. He established at once, in fact, that fine tradition, which the chemists of King's have since followed, of combining original research with a full recognition of the requirements of the chemical industries that have developed to an incredible extent within the century now past.

Daniell and Electrochemistry

Daniell's prime services to his science were, without doubt, in the department of electrochemistry. Here his researches were of supreme importance. Together with those of Faraday, Daniell's experiments may fairly be said to have laid the quantitative foundations upon which the vast and complex structure of modern electrochemistry has been rapidly raised. On the other hand, Daniell's theroetical interpretation of the processes of electrolysis broke entirely new ground, and still remains a classic of acute reasoning based on carefully observed fact. His invention of the type of cell ever since associated with his name was to prove of incalculable assistance both to the student and to the works chemist.

It was characteristic of the man and of his time that he was by no means fully absorbed in the electrical aspect of the science. He invented the Daniell hygrometer, which meteorologists use to this day. Again, he was one of the first chemists to study those catalytic reactions which, since his time, have been found to possess untold value in many industrial processes. For example, he made a thorough investigation of the oxidation of alcohol by air in the presence of platinum. This piece of research was elaborated at a later date by other chemists and led to the development of a new rapid process for the manufacture of acetic acid—one more example of the manner in which purely scientific investigations can be turned to practical account in unexpected ways.

W. A. Miller

Professor W. A. Miller, who was appointed to the chair of chemistry in 1845, was a man of wide attainments and varied interests. He gained distinction by the valuable research work that he did in conjunction with the great astronomer Huggins on the spectra of the stars. He was famous, too, as a water analyst, and made a special study of the action of water on lead that is still remembered. He was also assayer to the Mint and to the Bank of England. Professor Miller was twice president of the Chemical Society, and did much to emphasise the close association between the laboratory and the works that his predecessor had established as a King's College tradition.

Another name of importance in the history of chemistry is that of Dr. (afterwards Sir) W. N. Hartley. Though he did not hold the chair, he was in his early days a demonstrator in the department, and it was at King's College that he began his epoch-making experiments on absorption spectra. Dr. Hartley was, incidentally, the first to apply dry-plate photography to the study of spectra; he invented a method of photographing entire spectra on single plates. His researches may be said to have founded the study of the relation between absorption spectra and chemical constitution. The discoveries that followed had, as is well known, a profound influence on many branches of chemistry. But it may be noted that, apart from this high scientific merit, these researches found a useful application in respect of practical problems, such as the identification of small quantities of poisonous alkaloids, the thermo-chemistry of the changes which occur in the Bessemer steel process, and various difficulties that arise in the brewing of beer.

Optical Glass

In the early days of the war, the King's College Chemical Department became known even to the general public for the research work on optical glass which was energetically pursued there by Sir Herbert Jackson and his staff. The outbreak of war had suddenly revealed our almost complete dependence on foreign sources of supply for the optical glass that was required for photographic lenses, telescopes, binoculars, range-finders, and many scientific instruments in everyday use in industry. Sir Herbert Jackson at once undertook to investigate the materials and processes used in glass-making, and he and his staff pursued their researches to such good purpose that the British optical glass industry was quickly revived and placed upon a sound technical basis. British glass-makers were not only enabled to supply the fighting forces with optical instruments of good quality, but were encouraged to develop an industry which can now hold its own with any foreign competitor. Seldom has the value of pure scientific research been so fully or so quickly demonstrated as in this case. Sir Herbert Jackson, it may be noted, is now the Director of the British Scientific Instruments Research Association.

Professor Crossley

The late Professor A. W. Crossley, formerly of King's, was the first Director of the British Cotton Industry Research Association. His notable powers of organisation and of planning research ensured the successful inception of this important undertaking. It is perhaps appropriate to notice that Professor Crossley, in his presidential address to the Chemical Society and in a lecture to the Royal Institution, chose as his subject the co-operation of science and industry.

This brief review of the industrial connections of the scientific work of former members of the staff would be incomplete without some reference to the constant endeavour of the department to reach and maintain a high standard in the work of teaching, and also to the part which it has played in the development of the education received by the professional chemist. Some evidence of the active interest in teaching taken by former members of the staff, and of their powers as exponents of their subject, is found in the text-books written by Professor Miller and by Professor Bloxam. Both these became standard works and were widely used; it is significant that Professor Bloxam's text-book, first published in 1867, appeared in an eleventh edition in 1923, and is still valued by students and teachers.

Professor J. M. Thomson has been prominently associated with the improvement of the education of the chemist. In 1875, when the first discussions were held which led to the foundation of the Institute of Chemistry, Dr. Hartley and Mr. Thomson, both members of the chemical staff, were present and took an active part in the developments which ensued. The association of the department with the Institute which was founded to promote the education and protect the interests of professional chemists has always been closely maintained. The extent of Professor Thomson's work and its value to the Institute of Chemistry may be judged from the fact that he has acted as Honorary Secretary and Registrar, as Censor, as Examiner, as member of Council, as Vice-President and as President. Dr. Hartley acted as Secretary, and later as Vice-President, Examiner and President. Mr. P. H. Kirkaldy, a former member of the chemistry staff, has been Vice-President and is now Treasurer, whilst Mr. Pilcher, an old student of the College, has been Registrar and Secretary for the past 28 years. These facts give evidence of the valuable work done by the Department of Chemistry at King's College in the organisation and development of the profession of chemistry.

John Benn Hostel Matinee

PRINCESS MARY has consented to attend a special matinee of "Mr. Cinders" at the Adelphi Theatre on Tuesday, May 7, in aid of the John Benn Hostel and Milner Hall, the East-end working lads' home opened by the Prince of Wales in February, 1927. The boys' own minstrel troupe will provide an additional entertainment. Tickets may be obtained from the usual agencies or from Miss F. Robinson, Bouverie House, Fleet Street, London, E.C.4.

Commercial Cylinders for the Permanent Gases

Issue of Revised Summary of Recommendations by the Research Committee

The First Report of the Gas Cylinders Research Committee of the Department of Scientific and Industrial Research (published by H.M. Stationery Office, 1921) is now out of print. It was accordingly decided to republish the summary of recommendations contained in that Report. In view of this proposal, the Committee took the opportunity not only of incorporating in the republished version one alteration (relating to the protection of the valves) which had previously been made, but also of making certain further revisions which appeared desirable. In its present form the summary (published by H.M. Stationery Office under the title, "Ordinary Commercial Cylinders for the 'Permanent' Gases, Summary of Recommendations (Revised)," price 4d.) is to be regarded as superseding the original. The main recommendations of the summary appear below.

THE following recommendations regarding ordinary commercial cylinders for the storage and transport of the "permanent" gases, states the summary, are alternative to the recommendations made by the Home Office Committee of 1895.

The Material of the Cylinders

The cylinders should be made of carbon steel having the following approximate composition:—Carbon, between 0·43 and 0·48 per cent.; sulphur, not to exceed 0·045 per cent.; phosphorus, not to exceed 0·045 per cent.; manganese, between 0·5 and 0·9 per cent.; silicon, not to exceed 0·3 per cent.; the balance being iron. No alloy steel should be used for this purpose.

The steel used for making the cylinders should be produced by the acid or by the basic open-hearth process. Blooms and billets for the manufacture of cylinders should be supplied with a guarantee from the steelmaker that the ingots from which they have been produced have been made by an approved process.

Manufacture of Cylinders

The cylinders should be made of seamless steel tube. The thickness of the cylinder wall should not be less than the value of t (in inches), as given by the formula $t = pD/2f + p$, where p = maximum working pressure (lb./sq. in.), f = 22,400 lb./sq. in., and D = external diameter in inches. Before the necking operations, each cylinder should be examined for maximum and minimum thickness, and for external and internal surface defects. The weight of any cylinder of a given type should not be less than an agreed minimum dependent upon the designed thickness.

Cylinders, after manufacture, should be raised to a temperature not less than 820° C. and not exceeding 850° C. in a furnace, remaining within the furnace only for a time sufficient to ensure that all parts of the cylinder are at the same temperature. Before the temperature falls appreciably, they should be removed and allowed to cool in still air in such a position that they are not subjected to draughts. Each cylinder containing either a poisonous or inflammable gas should, when not in use, have its valve completely protected.

Every cylinder should be marked with:—Manufacturer's and owner's marks and rotation number, date of last hydraulic test, a mark indicating the specification to which the cylinder has been made, and chemical symbols (to be stamped on the valve) to indicate the gas for which the cylinder is used.

The Testing of Completed Cylinders

Mechanical tests should be made on the material of one finished cylinder in every batch, or in cases in which the number in any batch exceeds one hundred, on the material of at least one finished cylinder in every hundred. [The tests specified include tensile tests, impact tests, flattening tests, and hydraulic stretch tests.]

The maximum working pressure should be 1,800 lb./sq. in. until there is general agreement amongst gas compressors that a higher limit is desirable. Cylinders which are to contain inflammable gases should be fitted with valves having left-handed outlet threads for pipe connection. No oil or similar lubricant should be used on valves or other fittings. Each cylinder should be painted, according to the gas for which it is used, as specified in the scheme recommended by the British Engineering Standards Association.

Periodical Examination

Each cylinder should be submitted to the hydraulic stretch test specified at intervals of not greater than two years. Prior to each periodical test, the cylinder should be thoroughly cleaned and examined externally and, as far as practicable, internally, for surface defects, corrosion or foreign matter. For the internal examination a small electric lamp inserted into the cylinder is useful. Where internal rust or foreign matter is observed, the cylinder should be heated to a temperature not exceeding 300° C. and again cleaned and examined. After each hydraulic test the cylinder should be thoroughly dried before being put into service.

If, in any particular case, re-heat treatment of the cylinder material is considered desirable, that specified above should be given. After this re-heat treatment the cylinder, before being put into service, should again be thoroughly examined and subjected to the hydraulic test. No re-heat treatment should be given to a cylinder after it has been satisfactorily completed at the maker's works except as above.

Cylinders which fail to pass the tests should be destroyed.

Lord Colwyn Gold Medal

Conditions of Award

THE Institution of the Rubber Industry announces the following conditions for the award of the Colwyn Gold Medal for 1929: That the Colwyn Gold Medal be awarded for the year 1929 for an essay, submitted by a member of the rubber industry (of British nationality, but not necessarily a member of the Institution of the Rubber Industry) who has not completed his twenty-fifth year on January 1, 1929, which, in the opinion of the Council of the Institution of the Rubber Industry is considered the best; that the subject of the essay be "The Characteristics and Applications of Rubber." The length of the essay should not exceed 5,000 words, and it must be accompanied by a brief summary not exceeding 200 words; that the essay must be submitted under a *nom de plume*, the actual name and address of the author being enclosed in a sealed envelope addressed to the Secretary of the Institution of the Rubber Industry. The identity of each author will be treated as strictly private and confidential until the permission of the author has been obtained to publish his or her name; that no essay in connection with the 1929 award of the medal will be considered unless it reaches the offices of the Institution of the Rubber Industry, Faraday House, 10, Charing Cross Road, London, W.C., not later than September 1, 1929. Essays sent from overseas may, however, be received up to October 1, 1929; that the Institution has the right to publish any of the essays submitted; that the presentation of the medal be made at the annual general meeting of the Institution; that the final selection of the medallist be in the hands of the council of the Institution of the Rubber Industry; and that the council shall have power to modify these conditions if circumstances render such a step desirable.

The first Colwyn medal has been awarded to Professor G. S. Whitby, for distinguished services to the rubber industry

Birmingham's New City Analyst

MR. H. H. BAGNALL, B.Sc., F.I.C., public analyst for Salford, has been appointed City Analyst for Birmingham, in succession to Mr. J. F. Liverseege, F.I.C., who will retire in April under the age limit, after 43 years' service with the Birmingham Corporation, for 27 of which he has been City Analyst. Mr. Bagnall, who is thirty-five years of age, was third assistant to Mr. Liverseege in the Birmingham Corporation Analyst's Department from December, 1914 to December, 1915, and in April, 1920 was made senior assistant. He was appointed to Salford in March, 1926. During the war he had experience as analytical, research and works chemist to Chance and Hunt, Ltd. of Oldbury, and subsequently was senior chemist at the Birmingham Corporation Gas Works Laboratory, Nechells. Mr. A. F. Lerrigo, B.Sc., F.I.C., senior assistant to Mr. Liverseege, will be acting City Analyst until such time as Mr. Bagnall takes up his duties.

Chemical Industry in Canada

(From a Correspondent).

Canada's forward strides in the chemical industry have just been notably emphasised by two Canadians—Mr. Arthur B. Purvis, president and managing director of Canadian Industries Ltd., and Professor Harold Hibbert, head of the Department of Cellulose Chemistry at McGill University, Montreal.

Prospects in the Heavy Industry

Mr. Purvis foreshadows a tremendous advance in the heavy chemical industry. In commenting upon the recent acquisition by his company of the Grassell Co., with headquarters in Toronto, he points out that Canada is only on the threshold of wonderful developments. Canadian Industries, Ltd. it will be remembered, purchased the stock of the Canada Salt Co., through which it acquired an interest in the alkali industry, involving the manufacture and sale of salt, liquid chlorine, caustic soda, etc. The Grassell Co. makes sulphuric, hydrochloric, and acetic acids, Glauber's salt, and so on, and, in addition, handles a large variety of chemical re-sale business. To develop its heavy chemical lines still further, Canadian Industries contemplates other new and important steps in the near future.

Another recent addition by this enterprising company was the Canadian Ammonia Co., which does much the largest anhydrous business in the Dominion. With the technical and operating support of Imperial Chemical Industries and E.I. du Pont de Nemours and Co.—two of the world's largest chemical enterprises—Canadian Industries is already at the head of the list in that country in respect of the manufacture of explosives, sporting ammunition, artificial leather, celluloid, etc.

The View of the Pure Chemist

Professor Hibbert, speaking of the progress already made in the improvement and adaptation of wood-pulp for use in the textile industry, declares that the resources of his Department in McGill University are now being largely used to solve the problem of increasing the output of cellulose pulp at a reduced cost.

In this work considerable progress is being made, although so far it has been more largely confined to academic than to commercial results. But it is believed that the day is near when it will be possible to give practical effect to these new discoveries.

Importance of Raw Material

In speaking of the progress which the Canadian pulp and paper industry—now Canada's second largest—has made, Professor Hibbert points out that the greater part of the pulp now used in rayon production comes from Canada. Professor Hibbert's view is that very soon the Dominion will share most substantially in the benefits of the latest researches of pure chemistry, since not only can wood and pulp be utilised in the making of rayon, but also for other types of silk, such as the cellulose acetate type.

While hitherto it has been necessary to make the latter type from cotton, recent developments have shown that an equally satisfactory product may be made, wholly or in large measure, from sulphite pulp. It is almost impossible to estimate, at the moment, the importance of this discovery to a country like Canada, where pulp may be obtained in almost unlimited quantities for a very long time—perhaps always if afforestation be properly carried out. The country with the best supply of this commodity may thus become the one in which the manufacture of artificial silk will be most largely carried on, illustrating once again, and most forcibly, the importance of the possession of raw materials.

In the light of the research on wood and wood products which is being carried out by Canadian chemists, the value of Canada's forests may be marked up from time to time. During the recent slump in the market value of Canadian pulp and paper, they appeared for a while to be likely to be a little marked down. If to-day it is cheap paper that is produced from Canada's vast areas of woodlands, to-morrow it may be some other product, possibly of far greater value.

Professor Hibbert has indicated how the raw product of the present may become even more valuable in the future. For instance, cellulose will be used in the manufacture of paint and varnish on an ever-increasing scale. For in the new developments of these particular lines of manufacture, cellulose is required, and this can be derived from the wood with which Canada is so generously supplied.

The creation of a large Canadian manufacture of explosives, used in constructional and other work, is also forecast by Professor Hibbert, thus indicating still further use for Canadian cellulose.

Low Temperature Carbonisation

An Important Plant at the Mines de Lens

Obviously one of the most important fields for low temperature carbonisation, especially in Great Britain, is the treatment of bituminous dust and smalls at the mines to give large-sized pieces of high-grade, free-burning, smokeless fuel, equal or superior in quality to graded lump coal.

Significant in this connection is a "K.S.G." plant of one standard retort, 80 tons of coal per 24 hours throughput, now being installed at the famous Mines de Lens, in the Pas-de-Calais area. The management have for many years followed closely the development of low temperature carbonisation because of the important possibilities as regards utilisation of the fines, and eventually they came to the conclusion that the "K.S.G." process was the best available, which was confirmed by extensive large scale test with Lens coals carried out in 1927 on the well-known "K.S.G." retort at the Karnap Collieries, Essen. As a result, a special company, "Carbonia," has been formed, with which are associated the Mines de Lens, Mines de Dourges, Mines et Houilleries de Marles, Mines de Sarre et Moselle, and the Mines de Vicoigne, Noeux, et Drocourt. This company is erecting the "K.S.G." plant, and, as usual, the standard retort, with a throughput varying from 65–85 tons per 24 hours, is a rotary, slightly inclined steel cylinder, 76 ft. long by 10 ft. diameter, having an inner cylinder 5 ft. 8 in., while the speed is one revolution in 90 seconds. Also the period of travel of the charge, through both cylinders in turn, is approximately 2½ hours, while the maximum temperature is 925–1025° F., with external heating by means of a firebrick setting. The yield follows the normal low temperature practice, from one ton of average bituminous coal of 25–35% volatile matter being 3,500–5,000 cubic feet of rich gas at 800 B.Th.U. per cubic foot, 3 gallons light oil scrubbed from the gas, 15–20 gallons low temperature tar, and 14 cwt. (70%) smokeless fuel with 10–20% volatile matter.

The site is at the Mines de Lens, and the gas will be mixed with coke oven gas and sold to the City of Lille, while the low temperature tar and the smokeless fuel is available as usual, the small coal to be used having only a value of about 80 francs per ton.

Since the end of the war the devastated area of Lens has now been completely reconstructed, the work having commenced in 1921, and the Mines de Lens, at the present time turning out about 4,000,000 tons of coal per annum, has 282 kilometers of reconstructed railway line in use more than in 1913," while there are 8,818 workmens' dwellings, and the output of the mines per head has been enormously increased because of the installation of the very latest plant and machinery.

Receiver Appointed for a Tar Company

On Friday, March 22, in the Chancery Division, Mr. Justice Eve had before him a motion in the action by a debenture holder named Fry against Burnden Tar (Bolton), Ltd., for appointment of a manager of the defendant company.

Mr. Parton, for plaintiff, said he held debentures for £3,000 issued by the company. The debentures were due and the interest was in arrears, and the company had gone into liquidation. Therefore this was a case of jeopardy. The defendant company were manufacturing chemists and drysalters.

His lordship observed that he supposed the company had arrived at the end of their resources, and he must have evidence as to where the liquidator was obtaining money to carry on the business. He would appoint a receiver, but there must be a further application to appoint him manager.

Laboratory Stop-Watches

Three types of stop-watches are manufactured by A. Arnold and Co., of 17, Elmcroft Avenue, Golders Green, London. The most interesting, from the point of view of the chemist, is the "Laboratory Chronograph." This is fitted with a very fine lever movement with fly-back action. It is made in gun-metal, oxidised, or nickel cases, with an easily-read dial.

Chemical Engineers' Dinner

Industry's Debt to Chemical Engineering

THERE was a distinguished company at the annual dinner of the Institution of Chemical Engineers, on Wednesday, March 20, presided over by Sir Alexander Gibb, and held in the ballroom of Grosvenor House, Park Lane. The guests were welcomed by Professor and Mrs. Hinchley and formally received by Sir Alexander and Lady Gibb.

The toast of "The Institution of Chemical Engineers" was proposed by Viscount Chelmsford, chairman of the Council of University College, London, who remarked that in recent years he had been continually associated with appeals in connection with chemical engineering. In 1917 a memorial was founded to that great chemist Sir William Ramsay, and part of the memorial took the form of a Chair of Chemical Engineering at University College. Industry appeared to him to have hitched its wagon to the chemical engineer. Their chemical engineering students were being snapped up by the industries before they had finished their course. Lord Melchett had told him that the concerns with which he was associated were prepared to take as many chemical engineers as they could turn out. When the chemical, oil, and gas industries demanded chemical engineers they did so because they were of use to them. To-day the chemical engineer was the one man that all the industries were asking for.

Sir Alexander Gibb, in responding, said that before the war there were chemists and there were engineers, but chemical engineering as a distinct branch had now attained a very important position, and was counted one of the major functions of the engineer. While the Institution had succeeded wonderfully, he emphasised the point that they were more concerned with quality than with numbers.

The toast of "Kindred Institutions" was proposed by Mr. W. A. S. Calder, and responded to by Professor Jocelyn F. Thorpe (president of the Chemical Society) and Dr. Herbert Levinstein (chairman of Council of the Society of Chemical Industry).

Professor Thorpe attributed much of the recent advance in chemical industry to the chemical engineer; to him was due the introduction of reactions under high pressures, which were the reactions of the future and on which the industrial future of this country would largely depend.

Dr. Levinstein remarked that there really ought to be no kindred societies, but one great society, housed in one building, with centralised finance, a single collective subscription, controlling all our chemical publications, and under one direction. This, after all, was only the equivalent of rationalised industry.

Sir Frederic L. Nathan proposed and Sir W. J. Larke responded to the toast of "Our Guests."

The final toast was the president, proposed by his successor, Mr. J. Arthur Reavell. In responding, Sir Alexander Gibb paid a high compliment to the honorary officials of the Institution and the office staff. He had been very much impressed with the excellent work of the assistant secretary, Mr. Mackie, for whom he predicted a very successful future.

Engagement of Mr. John Benn

A MARRIAGE has been arranged, and will shortly take place, between Mr. John Andrews Benn, eldest son of Sir Ernest Benn, and himself an editor and author, to Miss Ursula Hankey, the only daughter of Sir Maurice Hankey, Secretary of the Committee of Imperial Defence, Secretary to the Cabinet, and Clerk of the Privy Council. The two families are near neighbours, Sir Ernest Benn's residence being Blunt House, Oxted, and Sir Maurice Hankey's Highstead, Limpsfield. Mr. John Benn, who was educated at Princeton (U.S.A.) and Cambridge, has been for about four years in his father's publishing business, of which he is a director. He has published a book in which American and British university methods are compared, under the title of *Columbus—Undergraduate*, and is at present editor of *Discovery*, a scientific monthly. Like his father and grandfather, Mr. John Benn takes naturally to the platform, and has a witty and attractive style. Miss Hankey is keenly interested in music; she studied for some time in Paris and is a brilliant pianist.

The Boot Lecture

THIS lecture, which commemorates the foundation by Sir Jesse Boot in 1921 of the Chair of Chemistry at University College, Nottingham, has been devoted in previous years to tracing out the evolution of some important branch of chemical industry. The subject chosen by Professor F. S. Kipping, D.Sc., F.R.S., on March 15, "Nickel and its Uses," which was suggested, primarily, by the activity of nickel shares, and by Lord Melchett's part as a mediator between capital and labour, possesses great historical and technical interest. The alloys of nickel have been found as coins, dated before the Christian era, although the metal was not recognised as distinct until its discovery by Cronsted in 1751 in "kupfer nickel" or "old Nick's copper." The manufacture of nickel from ores containing copper was undertaken in Saxony in 1830. The discovery of garnierite, an ore free from copper, gave a great impulse to nickel smelting in 1880, and the production increased by leaps and bounds after the discovery of the vast deposits of mixed ores at Sudbury, Ontario. Production was further stimulated by the war, and, after a temporary slump in 1918, an annual output of some 50,000 tons has been reached, the major part of which is derived from Sudbury. The smelting of ore for matte in Canada and the production of Bessemer matte at Swansea, and finally of nickel, was illustrated by flow sheets and equations. It was the recognition by Ludwig Mond in 1890 that powdered nickel catalytically decomposes carbon monoxide, with deposition of carbon at 350°-450°, that in a cooler tube a volatile nickel compound is formed which imparts a vivid colour to a carbon monoxide flame, or deposits a mirror of nickel on a heated tube, which resulted in the establishment on a commercial footing from about 1904 of the well-known Mond nickel carbonyl process. Pure nickel is now also obtained electrolytically, and its applications have been greatly improved, as, for example, by the deposition of a relatively stout (1-1,000th in. thick) impervious coating on iron. The alloys are of even greater importance. The special properties of nickel silver, otherwise pakfong, the natural alloy monel (Ni, Cu, Fe), nichrom and ferronickel are clearly conferred by this indispensable metal. The use of reduced nickel as a fat-hardening agent was an outcome of the discovery by Sabatier and Senderens from 1897 of its efficiency as a catalyst for the hydrogenation of organic compounds.

The numerous exhibits of alloys, Mond nickel balls and hardened fats were due to the courtesy of the Mond Nickel Co. and Lever Bros. respectively. E. B. R. P.

Strong Position of B.D.H.

Mr. Hill's Optimistic Speech

AT the annual general meeting of British Drug Houses, Ltd., held in London on Monday, Mr. C. A. Hill (chairman and managing director), who presided, said that in regard to trading generally during the year there had been an increase in turnover as well as in profit. The home trade showed an expansion over 1927, but this was entirely due to the increased sale of B.D.H. special products. They had again to report that the home trade in everyday drugs and chemicals had suffered throughout the year from intense competition. The sales of their fine chemicals for analysis and research showed a satisfactory increase last year. Their export trade, which was making great strides, was responsible for the chief part of the company's progress last year, and there again it was largely in B.D.H. medical and scientific products.

The improvement in the result for 1928 constituted a definite vindication of B.D.H. policy—namely, development by keeping abreast of scientific progress. B.D.H. had pursued their policy in the manufacture of new medicinal products generally and biochemical products in particular—the last a branch of fine chemical manufacture which year by year was assuming greater importance.

The current year opened with bright prospects, and should the year's trading continue to be equally favourable, the directors would, with the figures for the half year before them, give serious consideration to the question of declaring an interim dividend on the ordinary shares.

The report and accounts (details of which were given last week, p. 290) were unanimously adopted.

Society of Dyers and Colourists

A Group of Papers

A MEETING of the Manchester Section of the Society of Dyers and Colourists was held on Monday, Mr. G. E. Holden presiding.

A paper entitled " A Note on the Effect of Light on Coloured Cotton Fabric, Part 3," was read by Miss Eva Hibbert, who explained that the success which had attended previous efforts to isolate the fading products of colouring matters had encouraged her to extend the investigation. Before attempting the identification of the fading products of the anthraquinone vat colours it appeared to be advisable to study those of more simple compounds related to them.

Effect of Light on Anthracene Derivatives

In a communication to the Society in 1928, it had been shown that the effect of light on anthracene was, in substance, to convert it into anthraquinone. If calico was impregnated with anthracene and exposed to light, the conversion into anthraquinone was easily and quickly observed. It appeared to be probable that the more rapid action on calico, and its suitability for such an investigation, resided in the fact that calico readily permitted the passage of air and light, while paper was more obstructive to light, as was also artificial silk. A number of simple derivatives of anthraquinone were dissolved in alcohol, and the alcoholic solutions were allowed to evaporate on calico. The specimens were exposed to the light of the Fadeometer, and certain products which showed definite signs of fading after 12 hours' exposure were selected for further experiment. Larger pieces of calico were also impregnated and subjected to a longer period of exposure. Wool and silk were also dealt with. Miss Hibbert considered that the formation of oxalic acid, or a related compound, by light or air oxidation, and subsequent selective action between fibre and colours provided an explanation for some of the curious phenomena of light action.

The Singeing of Cotton

Mr. G. E. Holden read a paper entitled " The Singeing of Cotton and the Formation of Oxycellulose." He stated that in a previous communication he had ventured to suggest that the operation of singeing, when carried out under certain controlled conditions, induced the formation of oxycellulose. It was his definite opinion that for the purpose of detecting faults a revision of the processes of treatment from start to finish, especially those which had been thought to be beyond improvement, would amply repay attention. The singeing of cotton fabrics was accomplished while the material was in a dry state, or practically as it came from the loom, a procedure which might appear to be quite satisfactory in practice, but actually was not the best method to adopt either from the theoretical or the practical point of view.

It was the better practice to dry the material uniformly before it was allowed to come into contact with the singeing area by passing it over heated drying cylinders, or by gassing lightly. This method of treatment gave the more satisfactory results, because otherwise those portions of the material which contained more moisture than other portions behaved differently, after singeing, in the rate of absorption of substantive colouring matters. The portions containing moisture at the moment of singeing would take up a larger amount of colouring matter than the portions free from moisture.

Singeing and Dyeing

The operation of singeing might be of great service to the colourist in many cases, in assisting to remedy faults through staining on dyed cotton fabrics to such an extent that the material needed to be stripped of all colour by an appropriate discharge agent. In such cases simply singeing of the faulty material before discharging the colour ensured level stripping and subsequent level re-dyeing of the cotton. The results of the further experiments undertaken by Mr. Holden demonstrated the differences in the absorption of colouring matters brought about by singeing, in the case of a direct and in the case of a basic colouring matter, the absorption being resisted in the case of the direct and increased in the case of the basic dyestuff. These phenomena were plainly an indication of the formation of oxycellulose. Fluidity tests had also been made with the intention of affording confirmatory evidence, which they offered to a marked extent, as the figures given for the singed cotton represented a degree of tendering exhibited by highly oxidised cellulose. Therefore, it was established that the operation of singeing induced the formation of oxycellulose.

A third paper, entitled " The Storage of Steam," was read by Dr. E. G. Ritchie, representing Ruths' Steam Storage, Ltd.

New York Chemical Exposition

THE twelfth Exposition of Chemical Industries will open at the Grand Central Palace, New York City, May 6 to 11, bringing together thousands of chemists, chemical and research engineers, and manufacturers and buyers from over forty industries. The various groups will exhibit the most modern equipment and advanced practices of chemical engineering and chemistry. A cross-section of the metals group shows fifteen exhibitors who will show various alloys. For the first time there will be exhibited a new acid-resisting alloy by Krupp. This metal is said to possess many special and unusual features that will be of great interest to the chemical industry. Considerable research and new development work has been undertaken during the past year in perfecting special alloys. The latest discoveries in this field will be presented. In the laboratory supply and equipment group a large number of interesting exhibits will be assembled. The instruments of precision group will have a number of exhibits, which will include a spectrophotometer and hydrogen ion colorimeter. These two will be of particular interest to the colour and dye industry. The hydrogen ion colorimeter is new and will be exhibited for the first time. A number of balances, microscopes, high temperature furnaces and colour analysing apparatus will also be exhibited. A new method of connecting vitreosil pipe lines will be presented.

Attendance at the exposition is confined almost entirely to users and buyers of chemicals and chemical equipment. The last exposition was attended by 67,000 visitors, who had come from 810 cities and towns in 40 States, and 199 cities and towns in 39 foreign countries. At the exposition this year Export Day (Thursday, May 9) will be awaited with much interest by the foreign representatives, and special attention will be given this feature by various exhibitors who plan to have their export managers and foreign sales departments in their booths to give every possible assistance to foreign buyers. Students' courses are being arranged and speakers fixed for the various lectures. The course will be under the supervision of Dr. W. T. Read, Professor of Chemistry at Texas Technological College, and the enrolled classes promise to exceed the record of 162 special students who attended the complete course at the last Exposition.

Centrifugal Pumps

ALL types of centrifugal pumps for the chemical and other industries are made by Beaumonts, Ltd., of Brinksway Pump Works, Stockport. Full advantage of recent improvements in resistant metals has been taken, and the newer non-corrodible metals have been added to the list of available materials. Pump-casings are now being made in cast iron, gun-metal, acid bronze, regulus metal, and also vulcanite-lined; the moving parts being of steel, stainless and other special acid steels, bronze, acid bronze, and nickel or nickel alloys. Single-stage pumps can be made for " heads " up to 75 ft., and multi-stage pumps for greater lifts. Pressure-sealing of the stuffing boxes is adopted when permissible, especially in the case of considerable " suction-head." " Full-bore " pumps are suggested when the liquid is viscous or contains solids in suspension. These pumps are being supplied in all sizes, suitable for tubing from ½ in. bore upwards.

Directory of Paper Makers

THE 1929 *Directory of Paper Makers* (London: Marchant Singer and Co., pp. 275, 5s.) maintains the high standard set by its former editions. The contents are as follows: Alphabetical lists of paper makers for England and Wales, Scotland, and Ireland; lists of paper enamellers, etc., and manufacturers of foil, etc.; representatives and paper agents; lists of mills; classification of makes with makers' names; trade designations (actual watermarks and trade names); standard names and sizes of papers and boards; sizes of papers; and paper trade customs.

From Week to Week

MRS. IONE DUNANT, the only daughter of Dr. Samuel Rideal, is to be married shortly to Mr. John Grace, M.P. for Wirral.

MAJOR D. H. CURRER BRIGGS, a director of the Whitwood Chemical Co., Ltd., of Normanton, has been appointed a member of the Safety-in-Mines Research Board.

AN EXPLOSION of 3,000 pounds of nitro-glycerine occurred on Tuesday at the plant of the Dupont Powder Co., at Gibbstown, New Jersey. One workman is reported to be missing.

A NEW COPPER REFINERY, which will cost about $4,000,000 (£800,000) is to be erected near Sudbury, Ontario. The new plant will be under the joint auspices of the International Nickel and Consolidated Smelter companies, and will have an initial capacity of 120,000 tons per annum.

PROFESSOR G. BARGER, F.R.S., professor of medical chemistry in the University of Edinburgh, and president of Section B (Chemistry) at this year's meeting of the British Association for the Advancement of Science, has been elected a corresponding member of the Bavarian Academy of Sciences.

A LOW TEMPERATURE CARBONISATION plant, which is claimed to be the largest in the world, is now in course of erection at Glenboig, near Glasgow. It is being built by the Bussey Coal Distillation Co., Ltd., and is to operate on the "Bussey" principle. When working the plant will have a "throughput" capacity of between 500 and 600 tons of coal a day.

A SPECIAL COURSE of eight lectures on "High Pressure Gas Reactions" will be given at the Imperial College of Science and Technology, London, on Friday afternoons at 4 p.m., commencing April 19, 1929, by Professor W. A. Bone, F.R.S., and Drs. D. M. Newitt and D. T. A. Townend. Details may be obtained from the Registrar, Imperial College, London, S.W.7.

LONG-SERVICE AWARDS were presented by Lord Melchett at Northwich, on March 21, to employees of Imperial Chemical Industries engaged at Fleetwood, Sandbach, Liverpool, Middlewich and Silvertown. Fifty-eight workers with forty years' service received gold medals, ninety received gold watches, and eighty-one with twenty-five years' service received silver watches.

INTERNATIONAL BITUMEN EMULSIONS, LTD., announce an agreement with the Standard Oil Company of California, providing for the formation of a new company, probably in America, to which the Bitumen company will transfer the goodwill of its business and all its property and assets, while the Standard Company will put into the new concern £340,000, either in cash or investments in manufacturing companies operating the processes.

THE SUB-COMMITTEE of the Committee of Civil Research, which has concluded its deliberations on the subject of radium and radium supplies, and has presented its report to the Cabinet, is understood to advocate the setting up of a central buying organisation, so as to prevent individual hospitals and authorities competing against each other for the quantities of radium they require. A full statement will be made by the Prime Minister after the Easter recess.

MR. T. ANDREWS, in the course of a lecture to the Hull Chemical and Engineering Society on Wednesday, March 20, dealt with "Naturally Occurring Catalyst Poisons in Oils." He said that in addition to any extraneous impurities which might contaminate the nickel catalyst, there existed naturally in the oils obtained from the cod and other fish inherent impurities which had serious effects upon the efficiency of the process. It was with the object of identifying these impurities that he carried out his experiments, which had led to a considerable advance in the difficult problem of catalyst poisons.

THE DEPARTMENT OF OVERSEAS TRADE states that it has been decided to establish a Trade Commissioner post (Grade I) in the Irish Free State with headquarters at Dublin, and to appoint Mr. W. Peters, C.M.G., to the new post. Mr. Peters was appointed Commercial Secretary (Grade II) for Russia in July 1919, and was promoted to be Commercial Secretary (Grade I) for Siberia in February 1921. He was appointed Assistant Agent of the British Commercial Mission to Russia in July 1921 and returned to England on the withdrawal of the British Mission from Russia in June 1927. Mr. Peters expects to leave England for Dublin about the middle of April.

METDURO, LTD., invited subscriptions on Monday for 450,000 7 per cent. cumulative participating preference shares of £1 and 450,000 ordinary shares of 1s. each. The company has been formed to acquire and exploit an invention relating to a liquid plastic substance to be known commercially as "Metduro," invented by Dr. Alfred Schmid, professor of physical chemistry at the University at Basle, Switzerland. "Metduro," it is claimed, can be moulded into any desired shape without pressure, and solidifies very rapidly under the action of a moderate degree of heat. The material is fire-proof, water-proof, acid-proof and oil-proof, and has high insulating properties, and is, moreover, exceptionally strong. The constituents of Metduro are cheap and readily obtainable in ample quantities. Professor Schmid will act as chief consulting chemist to the company.

RECENT WILLS INCLUDE: Mr. John Doull, F.C.S., of Edinburgh (personal estate in Great Britain), £4,338.

SIR JESSE BOOT, upon whom a barony was bestowed in the New Year Honours List, has chosen the title of Baron Trent, of Nottingham.

AT THE INQUEST, at Runcorn, on Friday, March 22, on Teodor Blank, aged 21, who was found dead in a side flue at the Astmoor works of the Chemical and Metallurgical Corporation on the previous Wednesday, the jury returned a verdict of death by misadventure.

DR. CARL BOSCH, president of the I.G. Farbenindustrie A.-G., has gone to the United States in connection with the establishment of a holding company there, and possibly to organise the production of chemicals. Synthetic rubber is said to be one of the subjects which will be discussed.

THE POTASH DEPOSITS at Solikamsk, in the province of Perm, Russia, have been found to consist of sylvinite and carnallite, in the proportion 1 : 2. The carnallite layer is 30–35 metres and the sylvinite layer 10–12 metres thick. In some layers of 2–3 metres the potassium chloride content reaches 45 per cent.

THE INDUSTRIAL DELEGATION which left London for Moscow on Monday included Mr. A. D. Cory James, of the Mond Nickel Co., Ltd.; Mr. F. W. Knibb, of British Glues and Chemicals, Ltd.; Major T. Knowles, of Boots' Pure Drug Co., Ltd.; and Mr. H. V. Parker, a director of the Cookson Produce and Chemical Co., Ltd. (representing Associated Lead Manufacturers Export Co., Ltd.).

THE PARLIAMENTARY SUB-COMMITTEE of the Swansea Council met last week to consider an application from the English Crown Spelter Co. for permission to discharge sulphuric acid effluent from their Port Tennant Works on to the foreshore on the east of Swansea Bay. The committee felt that it was not a desirable project, and will report to that effect at the next full meeting of the Parliamentary committee.

DR. H. RAISTRICK has been appointed by the Senate of London University to the new chair of biochemistry in the School of Hygiene and Tropical Medicine. Dr. Raistrick was educated at the Universities of Leeds and Cambridge. At Cambridge he undertook special research work in chemico-bacteriology, and held a university staff appointment. He has held the post of director of biochemical research to Nobel's Explosives Co., Ltd.

MR. ERNEST WALLS, the chairman of the North British Artificial Silk Co., Ltd., which will shortly commence operations in Jedburgh, states that the factory will absorb all the unemployed in Jedburgh district; 150 workers will be required to start production, and the factory should be employing 600 men, boys and girls by the end of the year. The combined textile and chemical process of manufacture will prevent work from being stopped during the week, and three eight-hour shifts per day will be in operation.

MR. R. B. PILCHER, Registrar of the Institute of Chemistry, in a lecture to the Liverpool Section of the Institute last week, traced the history of alchemy from its beginnings in Egypt and China down to the time of Robert Boyle and the foundation of the Royal Society. When Boyle published his "Sceptical Chemist," the old ideas as to what chemistry could do were abandoned, and thenceforth serious workers followed in increasing numbers, revealing more and more clearly the secrets of Nature for the benefit of mankind. It was largely on chemistry that progress in industry and commerce must depend, and the chemist had still many problems to solve.

SIR JAMES IRVINE, F.R.S., principal of the University of St. Andrews, has been recommended by the committee of the Franklin Institute, Philadelphia, as recipient of the Elliott Cresson Medal of the Institute, "in consideration of his brilliant researches in the field of carbohydrate chemistry." The Elliott Cresson Medal is awarded "for discovery or original research, adding to the sum of human knowledge, irrespective of commercial value; leading and practical utilisations of discovery; and invention, methods or products embodying substantial elements of leadership in their respective classes, or unusual skill or perfection in workmanship." Professor C. T. R. Wilson, F.R.S., of the University of Cambridge, Nobel Prizeman in physics, is recommended as recipient of the Franklin Medal of the Institute, "in recognition of his numerous pioneer contributions to atomic physics."

Obituary

MR. FRANK WARBURTON, aged 68, chairman of Harrison, Blair and Co., Ltd., of Kearsley Chemical Works, Farnworth, near Bolton, last week. Educated at Southport and the Owen's College, he completed last year 50 years' active connection with his company, having been a director for 35 years.

MR. JOHN EDWARD DAVIDSON, for many years managing director of the United Alkali Co., on Saturday, March 23, aged 77, at his residence at Tynemouth. He began work with the late Mr. Allhusen, founder of the Allhusen works at Gateshead, and then became managing director of the Newcastle Chemical Works Co., Ltd. On the formation of the United Alkali Co., he became the first managing director. His eldest son, Mr. A. N. Davidson, succeeded him on his retirement from the company, and is now district manager of Imperial Chemical Industries.

References to Current Literature

British

ANALYSIS.—The determination of small amounts of alcohol in the human subject. J. Evans and A. O. Jones. *Analyst*, March, pp. 134–141.

The determination of small quantities of mercury in the presence of organic and inorganic compounds. R. Robinson. *Analyst*, March, pp. 145–152.

Indian *Ephedras*, their extraction and assay. S. Krishna and T. P. Ghose. *J.S.C.I.*, March 22, pp. 67–71T.

DYEING.—The effects of after-treatments on the degree of aggregation, location, shade and fastness properties of insoluble azo-colours on the fibre. P. Bean and F. M. Rowe. *J. Soc. Dyers and Col.*, March, pp. 67–77.

United States

CATALYSIS.—An extension of the intermediate-compound theory of catalysis in gas reactions. H. A. Storch. *J. Phys. Chem.*, March, pp. 456–458.

COLLOIDS.—Coagulation of blood and milk by electrolytes and the similarity between the clotting of blood and the formation of jellies. N. R. Dhar and S. Prakash. *J. Phys. Chem.*, March, pp. 459–466.

EMULSIONS.—The effect of electrolytes upon emulsions. H. V. Tartar, C. W. Duncan, T. F. Shea, and W. K. Ferrier. *J. Phys. Chem.*, March, pp. 435–446.

Alkaline earth stearate emulsions: A study of some properties of water-in-oil emulsions formed by soaps of the alkaline earths. A. P. Lee and J. E. Rutzler. *Oil and Fat Industries*, March, pp. 15–18.

GENERAL.—The flow of clay pastes through narrow tubes. G. W. Scott Blair and E. M. Crowther. *J. Phys. Chem.*, March, pp. 321–330.

Is hydrogen peroxide formed in electrolytic gas by alpha rays? B. M. Marks. *J. Phys. Chem.*, March, pp. 381–383. No hydrogen peroxide or ozone could be found.

Research and the mayonnaise industry. F. C. Blanck. *Oil and Fat Industries*, March, pp. 10–13, 43.

Solubility tests of castor oil. H. P. Trevithick and M. F. Lauro. *Oil and Fat Industries*, March, pp. 27–29.

WOOD.—Density of wood substance, adsorption by wood, and permeability of wood. A. J. Stamm. *J. Phys. Chem.*, March, pp. 398–414.

German

ANALYSIS.—Dielectric measurements as a rapid method of water determination. E. Berliner and R. Rüter. *Kolloid-Zeitschrift*, March, pp. 251–257.

APPARATUS.—A modern industrial refractometer. W. Ewald. *Chemische Fabrik*, March 20, pp. 133–135.

The abolition of the Baumé hydrometer. T. Wallis. *Chemische Fabrik*, March 20, pp. 135–136. The suggested abolition of the Baumé hydrometer has found surprisingly rapid support in German industry, but the question of a suitable or improved substitute has been raised.

Apparatus for the determination of leakage in adsorption plants. A. Mackert. *Chemiker-Zeitung*, March 20, p. 228.

CELLULOSE.—Note on the question of the dispersion of dissolved cellulose. H. Zeise. *Kolloid-Zeitschrift*, March, pp. 248–254.

COLLOIDS.—Colloidal solutions of potassuim ferrocyanide. A. Kutzlnigg. *Kolloid-Zeitschrift*, March, pp. 221–222.

ETHYL PETROL.—Ethyl petrol. H. Kiemstedt. *Chemiker-Zeitung*, March 13, pp. 205–207; March 20, pp. 226–228.

FOOD.—Technical aids in the production of food. I and II. A. Behre. *Chemiker-Zeitung*, March 16, pp. 217–218; March 23, pp. 238–239.

GENERAL.—The retention of phosphoric acid by ferric hydroxide in the presence of changing quantities of ammonia. E. Angelescu and G. Balanescu. *Kolloid-Zeitschrift*, March, pp. 207–221.

Miscellaneous

ADSORPTION.—The adsorption of hydroxybenzenes and other aromatic compounds and their replacing action upon each other at the interface water-charcoal. I. M. Kolthoff and E. Van der Goot. *Recueil Travaux Chimiques Pays-Bas*, March 15, pp. 265–287 (in English).

The adsorption of phenols at the interfaces water-air, water-carbon, and water mercury. A. Frumkin. *Recueil Travaux Chimiques Pays-Bas*, March 15, pp. 288–290 (in German).

The absorption of formaldehyde by cellulose. J. J. Blanksma. *Recueil Travaux Chimiques Pays-Bas*, March 15, pp. 361–362 (in English).

The absorption of formaldehyde by starch. J. J. Blanksma. *Recueil Travaux Chimiques Pays-Bas*, March 15, pp. 350–360 (in English). Dried potato-, wheat-, maize- or arrowroot-starch gives an adsorption compound, formaldehyde-starch, on heating with trioxymethylene for 3 hours at 160° C. The quantity of formaldehyde taken up by the starch is dependent on the concentration of the formaldehyde vapour present in the tube when equilibrium is reached.

ANALYSIS.—Considerations on the determination of iodine values. II.—The action of iodine chloride solutions on fatty acids with conjugated double links. E. T. Gelber and J. Böeseken. *Recueil Travaux Chimiques Pays-Bas*, March 15, pp. 377–385 (in German).

The micro-titration of iodides, even in the presence of large quantities of nitrite. J. F. Reith. *Recueil Travaux Chimiques Pays-Bas*, March 15, pp. 387–390 (in German).

The determination of the fluosilicate ion, and of fluorine in general. E. Bayle and L. Amy. *Comptes Rendus*, March 11, pp. 792–794 (in French).

Mercurimetric studies, I.—The titrimetric determination of the cyanide ion. II. The titrimetric determination of the mercury nitroprussides. E. Votocek and J. Kotrba. *Collection of Czechoslovak Chemical Communications*, March, pp. 164–172 (in French).

GENERAL.—The decomposition of an aqueous bromine and bromic acid solution by charcoal. I. M. Kolthoff. *Recueil Travaux Chimiques Pays-Bas*, March 15, pp. 291–297 (in English).

The influence of charcoal upon the velocity of the reaction between iodide-iodate and hydrogen ions, the decomposition of thiosulphuric acid and the reaction between phenol and bromine. I. M. Kolthoff. *Recueil Travaux Chimiques Pays-Bas*, March 15, pp. 298–300 (in English).

The ternary system water-sodium nitrate-potassium nitrate. E. Cornec and H. Krombach. *Comptes Rendus*, March 11, pp. 788–790 (in French).

The action of helium on platinum. H. Damianovich. *Comptes Rendus*, March 11, pp. 790–792 (in French).

A contribution to the study of the complex salts of dimethylglyoxime. J. V. Dubsky and F. Brychta. *Collectn. of Czechoslovak Chemical Communications*, March, pp. 137–154 (in English).

ORGANIC.—The action of phosphorus trichloride on formic acid and on acetic anhydride. A. van Druten. *Recueil Travaux Chimiques Pays-Bas*, March 15, pp. 312–323 (in English).

A crystalline acetin and a crystalline diglycide. M. Battegay, H. Buser, and E. Schlager. *Comptes Rendus*, March 11, pp. 796–798 (in French).

The catalytic reduction of dioximes: Preparation of 2:3-diaminobutane by the reduction of dimethylglyoxime. J. Frejka and L. Zahlova. *Collection of Czechoslovak Chemical Communications*, March, pp. 173–187 (in French). Catalytic reduction of dimethylglyoxime in the presence of platinum black, under pressure, gives a 50 per cent. yield of 2:3-diaminobutane.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

306,434. PYRANTHRONE DYESTUFFS. The British Alizarine Co., Ltd., and P. Beghin, Trafford Park, Manchester. Application date, November 17, 1927.

Pyranthrone or a substitution product is subjected to the action of sulphuryl chloride at a temperature above 140° C., while in suspension or solution in a large proportion of an organic liquid such as nitrobenzene or nitrotoluene. The product differs from previously known halogenated pyrathrones and dyes cotton and other fibres green from a bluish-red vat. The dyed material may be treated with oxidising agents such as sodium hypochlorite hypochlorous acid, or sodium bichromate, to obtain a fast brown shade. Examples are given of the treatment of pyranthrone dichlorpyranthrone and dibrompyranthrone.

306,562. ACID PROOF PIPES, TANKS, ETC. H. W. Fender and Prodorite, Ltd., Eagle Works, Leabrook, Wednesbury, Staffordshire. Application dates, August 22 and September 5, 1927, and June 21, 1928.

An acid-proof tank consists of an outer container which is mechanically strong, but not acid-proof, and an inner lining of bricks or blocks dovetailed together and spaced away from the outer container. The intermediate space is filled with a cement consisting of bitumen and mineral powder, which is liquefied by heat and poured in. The intermediate space may also contain a reinforcement of expanded metal, felt, or asbestos paper. A similar method may be used for covering a wall.

306,563. HYDROXY-ALKYLAMINES, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 24, 1927.

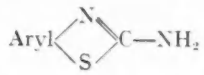
It is known that alkylene oxides react with ammonia to form mixtures of various hydroxy alkyl amines, *e.g.*, ethylene oxide and ammonia furnish mixtures containing ethylanol-amine, diethanol-amine, and triethanol-amine, in proportions depending on the amount of ammonia employed. The temperature may rise considerably during reaction. It is now found that if the ethylene oxide is slowly added to ammonia solution and the temperature maintained at 10° C., monoethanol-amine is obtained, while, if the temperature is 25°–30° C., triethanol-amine is obtained. The reaction is effected in towers in which ammonia solution is circulated by pumping, while the alkylene oxide is slowly introduced. The conversion is nearly quantitative. Examples are given of the production of mono- and tri-ethanol-amine, and monopropanol-amine.

306,573. DYES. R. S. Barnes, J. E. G. Harris, J. Thomas, and Scottish Dyes, Ltd., Earl's Road, Grangemouth, Stirling. Application date, November 17, 1927.

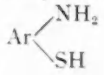
Anthraquinone acridones are usually obtained from arylamino-anthraquinone-ortho-carboxylic acids by ring closing, but in this invention they are obtained by submitting anthraquinone-carboxylic acids containing an arylamino substituent in the ortho position to the carboxyl group to esterification by treating with a tertiary base-sulphuric anhydride compound in the presence of an excess of a tertiary base and a metal such as is described in Specifications No. 247,787 and 251,491 (See THE CHEMICAL AGE, Vol. XIV, pp. 334 and 577). The products are submitted to the action of an oxidising agent for the production of anthraquinone acridones. These esters have an affinity for animal, vegetable and mineral fibres, and can be used for dyeing, padding, and printing processes. Fabrics impregnated with the esters can be treated with an acid oxidising agent in dilute solution to obtain the anthraquinone acridones, thus avoiding the use of vats. Examples are given of the treatment of 1-(β-naphthylamino)-anthraquinone-2-carboxylic acid with pyridine and pyridine sulphuric anhydride and copper, and other similar reactions. The leuco esters obtained in the first stage are not identical with the known leuco esters of the anthraquinone acridones, but may be of the nature of esters of anthrahydroquinone-carboxylic acids containing an arylamino substituent ortho to the carboxyl group.

306,590. ORTHOAMINO-ARYL-MERCAPTANS, PROCESS FOR THE MANUFACTURE OF. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort on Main, Germany. Application date, November 23, 1927.

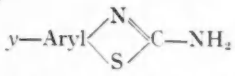
These compounds are obtained by treating at a raised temperature the 2-amino thiazolic compound of the general formula



with a concentrated caustic alkali solution, with or without an organic diluent such as an alcohol. The thiazole ring is split off and ortho-amino-arylmercaptans of the formula.



are formed. The starting material may be 2-amino-thiazol compounds which are obtained by acting in an acid medium with an inorganic sulpho-cyanide in the presence of a halogen on a primary arylamine in which the para-position to the amino group is occupied according to Specification No. 295,295. (See THE CHEMICAL AGE, Vol. XIX, p. 242). The 2-amino-aryl-thioazolic compounds thus obtained correspond to the general formula



in which *y* indicates that in the aryl residue the para position to the N-atom of the thiazolic ring is occupied. The products may be isolated in the form of their alkali or zinc mercaptides, and then condensed with mono-chloracetic acid. The ortho-aminoaryl-thioglycollic acids thus obtained are intermediates for the production of dyestuffs of the thio-indigo series. Examples are given of the treatment of 2-amino-4-methyl-6-chlorobenzo-thiazol with caustic potash to obtain potassium salt of 1-methyl-2-amino-5-chlorobenzene-3-mercaptan. This may be condensed with a sodium salt of monochlor-acetic acid to obtain 1-methyl-2-amino-5-chlorobenzene-3-thioglycollic acid. Several similar examples are given.

306,691. PYRITES, TREATMENT OF. S. I. Levy, 11, Englewood Road, Clapham Common, London, S.W., and G. W. Gray, 24, St. John's Wood Park, London, N.W.8. Application date, February 10, 1928.

The object is to obtain sulphur and ferric oxide in pure condition, together with chlorides of any non-ferrous metals without loss of sulphur as sulphur dioxide. The sulphide may be chlorinated and the ferrous chloride oxidised in one operation by bringing regulated quantities of sulphide and air into contact with ferrous or other metallic chlorides at elevated temperatures. The chlorinating medium is formed as an intermediate product, but is not separated. In another method, the chlorination and oxidation are effected in different stages. The reaction is exothermic, and the desired temperature is maintained by the heat liberated. The process is effected at 300°–400° C., and the sulphur driven off is mixed only with chlorides of arsenic and antimony, from which it is separated by fractional condensation. If a temperature of 500°–800° C. is employed, the chlorides of zinc and lead are also volatilised. The process is carried out in a rotating cylindrical furnace, the sulphide and air being introduced simultaneously at opposite ends. Chlorine is then passed in to form ferrous chloride, and is then followed by dry air which forms ferric oxide and drives off chlorine and/or ferric chloride which chlorinates the pyrites entering at the other end. The ferrous oxides may be associated with chlorides of zinc, copper and lead, and these may be extracted by leaching, leaving pure iron oxide.

In the alternative method, chlorination alone is first effected and the mixture of chlorides is then treated with air at 600°–1,000° C., which converts the ferrous chloride to ferric oxide. The non-ferrous chlorides partly remain, and are partly

driven off with the chlorine. Alternatively, the mixture of chlorides may be treated with chlorine at 250°–500° C., to volatilise ferric chloride, but not the non-ferrous chlorides. The ferric chloride may then be oxidised to ferric oxide.

306,705. NITRIC ACID, MANUFACTURE OF. W. R. Ormandy, 18, Belsize Grove, Belsize Park, London, N.W.3. Application date, February 21, 1928.

Oil fuel is burned with air in a flame submerged in water in a boiler at 90 lb. per square inch, in the presence of 0·04 per cent. of vanadium oxide, V_2O_5, relatively to the weight of the oil. A considerable proportion of nitric acid is formed, which may be neutralised by continually adding an alkaline material. The process may be effected in a steam generator employed for raising steam for power purposes. The exhaust from the engine is passed through oxidising towers containing water, and an alkali. It is found that at a boiler pressure of 10 atmospheres, 1,000 litres of the gases contain about 200 grams of nitric acid.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 279,857 (Schering Kahlbaum Akt.-Ges.) relating to decomposition compounds from condensation products of *m*-and *p*-cresol with acetone, see Vol. XVIII, p. 14; 281,288 (Ges. für Linde's Eismaschinen Akt.-Ges.) relating to extraction of ammonia from coke oven gas, see Vol. XVIII, p. 103.

International Specifications not yet Accepted

304,326. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, January 20, 1928. Addition to 284,247. (See THE CHEMICAL AGE, Vol. XIX, p. 305.).

Bluish red azo dyes insoluble in water are obtained by coupling an arylide of 2 : 3- oxynaphthoic acid with a diazotized monoaroyl-*m*-phenylene-diamine having in *o*-position to the amino groups a halogen atom and a methyl or alkyloxy-group or two halogen atoms. Examples are given.

304,585. ALCOHOLATES. Dr. A. Wacker Ges. für Elektrochemische Industries Ges., 20, Prinzregentenstrasse, Munich, Germany. International Convention date, January 21, 1928.

Metal hydroxides are boiled with alcohols having more than three carbon atoms in the molecule. Thus, caustic soda is boiled with *n*-butyl alcohol in a distillation apparatus. Water and alcohol distil over and when the reaction is complete the excess of alcohol is distilled at ordinary or decreased pressure.

304,613. DYES. L. Cassella and Co. Ges., Frankfort-on-Main, Germany. International Convention date, January 21, 1928. Addition to 260,998. (See THE CHEMICAL AGE, Vol. XVI, p. 69.)

An aqueous solution of an anthanthrone sulphonic acid is treated with a halogenating agent to replace the sulphonic acid by halogen. The products are used for dyeing and printing without purification.

304,640. CATALYSTS FOR REDUCING AND HYDROGENATING ORGANIC NITROGEN COMPOUNDS. Selden Co., 339, 2nd Avenue, Pittsburg, U.S.A. (Assigness of A. O. Jaeger, 9, North Grandview Avenue, Crafton, Pa., U.S.A.). International Convention date, January 23, 1928.

These catalysts consist of zeolites or non-siliceous base-exchange substances associated with catalytically active substances in exchangeable or non-exchangeable form. The base-exchange substances are obtained by reaction of a silicate with metal salts or metallates, or by reaction of metal salts and metallates. Natural base exchange substances may be used, and stabilisers may be added. A large number of examples of the catalyst are given. Reactions which can be effected include reduction of nitro derivatives of aromatic hydrocarbons or halogen substitution derivatives to the amino or intermediate bodies. Hydrogenation may take place simultaneously with the reduction.

304,654. CARRIERS FOR CATALYSTS. Compagnie Internationale pour la Fabrication des Essences et Petroles, 1, Avenue de Villars, Paris. International Convention date, January 23, 1928.

A cellular material is obtained by mixing clay, sawdust, and a binder such as mazut, and baking to eliminate the sawdust, first in a reducing and then in an oxidising flame.

304,655. SYNTHETIC DRUGS. R. Wolffenstein, 7b, Luciusstrasse, Dahlem, Berlin. International Convention date, January 23, 1928.

α-Phenyl-cinchoninic acid chloride is treated with a methane, or α-phenyl-cinchoninic acid amide with a chlorocarbonic ester, to obtain methanes of α-phenyl-cinchoninic acid.

304,688. SULPHURIC ACID. Mansfeld Akt-Ges. für Bergbau und Hüttenbetrieb, Eisleben, H. Krebs, Hettstedt, and R. Borchers, Burgorner, near Hettstedt, Germany. International Convention date, January 24, 1928.

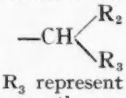
Apparatus for manufacturing sulphuric acid by the intensive system is made of iron, steel, or iron alloys instead of lead.

304,697. SUPERPHOSPHATE. Chemische Industrie Akt-Ges. and H. Meyer, 19, Reitbahn, Danzig, Germany. International Convention date, January 24, 1928.

Superphosphate is stored till $CaSO_4$-$2H_2O$ separates, and then dried at a temperature below that at which the water-soluble phosphoric acid is converted into the water-insoluble form, so that the water content is reduced to 5–6 %.

304,727. PHENOLS. Schering Kahlbaum Akt.-Ges., 170, Müllerstrasse, Berlin. International Convention date, January 25, 1928.

A dioxy-diphenyl-methane derivative is heated in the presence of a catalyst such as fuller's earth, diatomite, tonsil, or frankonite to obtain alkylene-phenols. The dioxy-diphenyl-methane derivatives contain the groups R_1 and



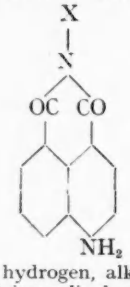
(where R_1, R_2, and R_3 represent hydrogen, alkyl, or aryl) directly linked to the methane carbon atom forming the bridge between the two phenolic residues. The carbon atom may itself be a member of a ring system. Some examples are given.

304,732. SYNTHETIC DRUGS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, January 25, 1928. Addition to 288,555. (See THE CHEMICAL AGE, Vol. XVIII, p. 555.)

To obtain phenol-aminoalkyl-ethers, a phenol containing an unsaturated alkyl group in the *o*-position to the hydroxy group, but which is not a derivative of an N-acetylamino-phenol, is treated with an alkylene dihalide in the presence of an alkaline agent and the resulting halogen compound is combined with a monoalkylamine.

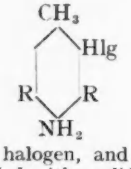
304,739, 304,744 and 304,794. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention dates, January 25 and 26, 1928.

304,739. Dyes for cellulose esters and ethers are obtained by interaction of the anhydride of 4-amino-1 : 8-naphthalic acid with ammonia or an amine. The products are of the type



in which X represents hydrogen, alkyl, aralkyl, or a substituted or unsubstituted isocyclic hydrocarbon residue. The dyes are greenish-yellow.

304,744. This is an addition to 287,908. (See THE CHEMICAL AGE, Vol. XVIII, p. 516). Diazo compounds of amines of the formula



where Hlg represents halogen, and R represents hydrogen and bromine, are coupled with arylides of 2 : 3-oxynaphthoic

acid to obtain monoazo dyes of good fastness to chlorine and kier-boiling. Examples are given.

304,794. An active α-derivative of 5 : 6-benzo-7-chlor-3-oxy-1-thionaphthene is condensed with 4 : 5-benzo-3-oxy-1-thionaphthene.

Specifications Accepted with Date of Application

279,819. Catalytic apparatus. Selden Co. October 27, 1926.
280,240. Calcium molybdate, Process of producing. A. Kissock. November 6, 1926.
281,703. Beniminazolone arsinic acids, Manufacture of. I.G. Farbenindustrie Akt.-Ges. December 2, 1927. Addition to 256,243.
282,783. Dyestuffs containing chromium, and the application thereof. Soc. of Chemical Industry in Basle. December 24, 1926.
285,814. Steel, Manufacture of. H. J. van Royen. February 21, 1927.
297,097. Iron from ores, Process for obtaining. Vereinigte Stahlwerke Akt.-Ges. September 16, 1927.
298,240. Pharmaceutical products, Products for the manufacture of. I.G. Farbenindustrie Akt.-Ges. October 6, 1927.
299,763. Water glass solutions, Production of. I.G. Farbenindustrie Akt.-Ges. October 31, 1927.
307,364. Vat dyestuffs, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). September 3, 1927.
307,375. Rubber, Production of. J. Y. Johnson. *I.G. Farbenindustrie Akt.-Ges.*). December 5, 1927. Addition to 300,719.
307,382. Low temperature tar and its distillates, Method of treating. G. T. Morgan and D. D. Pratt. December 6, 1927.
307,439. Pyritic ores, Roasting of. National Processes, Ltd., and S. Robson. November 8, 1927.
307,328. Vat dyestuffs, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 3, 1927.
307,524. Anhydrous metallic chlorides, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt-Ges.*) November 7, 1927.
307,529. Hydrogen and gas mixtures containing the same, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) December 2, 1927.
307,531. Sulphonic acids of N-aceto-acetylated aryl-amines, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) December 7, 1927.
307,532. Derivatives of hydroxy compounds containing mercury in the nucleus, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) December 8, 1927.
307,575. Granular fertilisers, Production of. W. J. Worboys and Imperial Chemical Industries, Ltd. January 9, 1928.
307,595. Sintering zinc ores. H. J. Stehli. February 7, 1928.

Applications for Patents

I.G. Farbenindustrie Akt.-Ges. and Imray, O. Y. Manufacture of naphthylamine-carboxylic acid derivatives. 8219. March 13.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of valuable masses from cellulose derivatives. 8,602. March 16.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Preparation of coatings. 8,603. March 16.
I.G. Farbenindustrie Akt.-Ges. Separation of gaseous mixtures by diffusion. 7,891. March 11. (Germany, March 31, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of azo dyestuffs 7,919. March 11. (Germany, March 10, 1928.)
I.G. Farbenindustrie Akt.-Ges. Increasing conductivity of electric arc atmospheres, etc. 7,928. March 11. (Germany, March 14, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of artificial threads, etc. 8,061. March 12. (Germany, March 12, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs. 8,089. March 12. (Germany, March 14, 1928.)
I.G. Farbenindustrie Akt.-Ges. Preheating ammonia gas. 8,211. March 13. (Germany, March 14, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of benzanthrone derivatives. 8,221. March 13. (Germany, March 16, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of artificial threads, etc. 8,222. March 13. (Germany, March 13, 1928.)
I.G. Farbenindustrie Akt.-Ges. Improving magnesium, etc., alloys. 8,337. March 14. (Germany, July 25, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of oils. 8,341. March 14. (Germany, August 15, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of viscose products. 8,360. March 14. (Germany, March 14, 1928.)
I.G. Farbenindustrie Akt.-Ges. Photographic roll films, etc. 8,361. March 14. (Germany, April 19, 1928.)
I.G. Farbenindustrie Akt.-Ges. Production of oils. 8,474. March 15.
I.G. Farbenindustrie Akt.-Ges. Production of nitroso-diazo solutions. 8,495. March 15. (Germany, March 15, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of polymerization products. 8,528. March 15. (Germany, March 16, 1928.)
I. G. Farbenindustrie Akt.-Ges. Manufacture of rubber-like products. 8,529. March 15. (Germany, March 16, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of runber-like substances. 8,530. March 15. (Germany, March 17, 1928.)
Imperial Chemical Industries, Ltd., Liddiard, E. A. G., and McGowan, J. Flux for lead lining. 7,865. March 11.
Imperial Chemical Industries, Ltd., Liddiard, E. A. G., and McGowan J. Separation of dissolved substances. 8,284, 8,285. March 14.
Imperial Chemical Industries, Ltd., Liddiard, E. A.G., and McGowan, J. Cracking oils, etc. 8,560. March 16.
Kunstharzfabrik Dr. F. Pollak Ges. Manufacturer of synthetic resin products. 8,141. March 13. (Austria, April 11, 1928.)
Kunstharzfabrik Dr. F. Pollak Ges. Manufacture of phenol formaldehyde condensation products. 8,246. March 13. (Austria, June 1, 1928.)
Scottish Dyes, Ltd., Thomas, J., Todd, W. M., and Wilson, J. S. Preparation of dyestuffs, etc. 8,369. March 14.
Soc. of Chemical Industry in Basle. Manufacture of dyestuffs. 7,920. March 11. (Switzerland, March 10, 1928.)

National Advertising Benevolent Society

Sir Ernest Benn, who was chairman on Friday, March 22, at the 11th annual festival dinner of the National Advertising Benevolent Society, at the Connaught Rooms, London, had the satisfaction of announcing that £7,050 had been raised in connection with the gathering.

Sir Robert Horne, M.P., who proposed the toast of "The Society," said he could remember the time when people who advertised largely were looked upon with suspicion, and when it was said that if people spent a great deal of money on the goods they sold they must be more expensive or of inferior quality. We had entirely departed from those silly old notions. A great truth lay behind the advertising profession. It was that the more goods one could sell the cheaper one could produce them. Sir Robert said the failure of British salesmanship in many instances was due to the fact that there was no proper appreciation of the state of mind of the people to whom they were appealing. Whereas before the war we had by far the largest export trade of the world—and it was necessary for us to have that, because we could not live without export trade—to-day the United States, which prided itself on its skill in salesmanship and its efficiency in advertising, was exporting three hundred million pounds worth of goods more in a year than we were. The U.S.A. export trade had grown to £1,000,000,000 annually, compared with our £700,000,000. There was great scope for new British markets in the Dominions, and he appealed to all engaged in salesmanship to take advantage of every opportunity offered of travelling to the Dominions, and to make themselves familiar with the actual needs of the people and their attitude towards the various goods produced in this country.

Sir Ernest Benn, responding, spoke of the excellent work of the National Advertising Benevolent Society, which during the past year had distributed £6,373 in relief of necessitous cases.

Sir Gomer Berry, Mr. Edgar Wallace, and Lieutenant-Colonel E. F. Lawson also spoke.

Lead Paint Act

In the House of Commons (March 21) Mr. Viant asked the Home Secretary whether he could indicate generally the results of the working of the Lead Paint Act, 1926; and whether he would now consider the propriety of ratifying the International Convention of 1921 with regard to white lead?

Sir W. Joynson-Hicks: Reports recently received indicate that, as a result of the co-operation between the inspectors and the industry, substantial progress has been made in compliance with the Act and Regulations, but, as the regulations only came into operation on October 1, 1927, and have therefore been in force for less than 18 months, it is not possible yet to form any reliable estimate as to their efficiency. The Act was passed on the understanding that, before prohibition was resorted to, the effect of regulations should be tried, and I am not, therefore, prepared to re-open this question at present.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6¼d. to 6¾d. per lb. Crude 60's, Mar., 1s. 10½d. per gall. April/June, 1s. 10d. per gall.

ACID CRESYLIC 99/100.—2s. 3d. to 2s. 10d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 10d. to 1s. 11d. per gall. Dark, 1s. 7½d. to 1s. 8½d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED.—5½d. to 6d. per gall. for 1080/1090. Unstrained, 6¾d. to 7d. per gall.

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 7½d. to 2s. per gall. Firm. Pure, 2s. to 2s. 2d. per gall.

XYLOL.—1s. 5d. to 2s. per gall. Pure, 1s. 8d. to 1s. 9d. per gall.

CREOSOTE.—Cresylic, 20/24%, 7½d. to 7⅝d. per gall.; Heavy, 6½d. to 6¾d. per gall. Middle oil, 4⅝d. to 5⅛d. per gall. Standard specification, 3⅝d. to 4¾d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8½d. to 9d. per gall. Solvent, 90/160, 1s. 3½d. to 1s. 4d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 8d. per gall. Solvent 90/190, 1s. 1d. to 1s. 4d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. to £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 31s. 6d. to 35s. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 4s. to 4s. 6d. per gall. 90/180, 2s. to 3s. per gal. Heavy, 1s. 6d. to 1s. 9d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—5½d. per lb.

m-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.

p-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITHROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 9d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £54 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅝d. to 5⅞d. per lb.

LAMP BLACK.—£32 10s. per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£23 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£10 to £12 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 10d. to 7s. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4d. to 2s. 5d. per lb.

ACID, BENZOIC, B.P. 2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 4d. per oz., according to quantity.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carraige paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—2s. 2d. to 2s. 3d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5½d. to 1s. 7d. per lb. Technical.—10½d. to 11½d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 4½d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.
BISMUTH CARBONATE.—9s. 9d. per lb.
BISMUTH CITRATE.—9s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 9d. per lb.
BISMUTH SUBNITRATE.—8s. 3d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 9d. per lb.
BISMUTH OXIDE.—12s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 9d. per lb.
BISMUTH SUBGALLATE.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 2s. to 2s. 3d. per lb.; potassium, 1s. 8½d. to 1s. 11½d. per lb.; sodium, 1s. 11d. to 2s. 2d. per lb.; granulated, ½d. per lb. less; all spot. Large quantities at lower rates.
CALCIUM LACTATE.—B.P., 1s. 3d. to 1s. 4d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 2d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—1s. 11d. to 2s. 2d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 9d. per lb.; potassium, 3s. per lb.; sodium, 2s. 11d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb.; U.S.P., 2s. 9d. to 3s. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 22s. per lb. net; Synthetic, 11s. to 13s. per lb.; Synthetic detached crystals, 11s. to 16s. per lb., according to quantity; Liquid (95%), 9s. 6d. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 6d. per lb.
METHYL SULPHONAL.—8s. 9d. to 9s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—2s. 5d. to 2s. 8d. per lb.
PHENAZONE.—3s. 9d. to 4s. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—97s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 6d. to 2s. 9d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—47s. per lb.; in quantity lower.
SALOL.—2s. 3d. to 2s. 6d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—2s. 3d. to 2s. 6d. per lb., B.P.C. 1923—2s. 8d. to 2s. 9d. per lb. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 2s. 2d. to 2s. 3d. per lb. Crystal, 2s. 3d. to 2s. 4d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—6s. 6d. to 6s. 9d. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—6s. 6d. per lb.
AUBEPINE (EX ANETHOL).—11s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—4s. 6d. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 3d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—15s. 6d. per lb.
COUMARIN.—8s. 6d. per lb.
CITRONELLOL.—10s. per lb.
CITRAL.—8s. 3d. per lb.
ETHYL CINNAMATE.—6s. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—13s. 6d. per lb.
GERANIOL (PALMAROSA).—22s. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—5s. per lb.
ISO EUGENOL.—15s. per lb.
LINALOL.—Ex Bois de Rose, 12s. 6d. per lb. Ex Shui Oil, 9s. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 16s. 6d. per lb. Ex Shui Oil Linalol, 10s. per lb.
METHYL ANTHRANILATE.—8s. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—34s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. per lb.
RHODINOL.—52s. per lb.
SAFROL.—2s. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—18s. 6d. per lb. Ex Geraniol, 15s. 6d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 9s. 6d. per lb.
ANISE OIL.—2s. 9d. per lb.
BERGAMOT OIL.—23s. 6d. per lb.
BOURBON GERANIUM OIL.—21s. per lb.
CAMPHOR OIL.—1s. 3d. per lb.
CANANGA OIL, JAVA.—11s. per lb.
CASSIA OIL, 80/85%.—6s. per lb.
CINNAMON OIL LEAF.—9s. 3d. per oz.
CITRONELLA OIL.—Java, 2s. per lb., c.i.f. U.K. port. Ceylon, pure, 2s. 2d. per lb.
CLOVE OIL (90/92%).—11s. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10½d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 17s. 6d. per lb.
LEMON OIL.—20s. per lb.
LEMONGRASS OIL.—4s. per lb.
ORANGE OIL, SWEET.—26s. 6d. per lb.
OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.
PALMA ROSA OIL.—13s. per lb.
PEPPERMINT OIL.—English, 87s. 6d. per lb.; Wayne County, 14s. 3d. per lb.; Japanese, 7s. 6d. per lb.
PETITGRAIN.—10s. per lb.
SANDALWOOD.—Mysore, 28s. per lb.: 90/95%. 18s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, March 27, 1929.

IN view of the nearness of the holiday, trade has continued remarkably active, and there is quite a fair interest shown for forward business. Prices on the whole continue firm. Export trade has been about average.

General Chemicals

ACETONE.—Firmer conditions are noticed in this product, and the article continues to be rather scarce; the price is firm at £75 to £85 per ton, according to quantity.

ACID ACETIC.—Steady conditions still obtain and prices are firm at £36 10s. to £37 per ton for the usual 80% grades.

ACID CITRIC.—After being somewhat slow of sale a better demand is being felt, and price is somewhat firmer at 2s. 1½d. to 2s. 3d. per lb. Forward position is extremely firm, and higher prices are likely later.

ACID FORMIC.—Demand has not been very active, and price is steady at £43 10s. for 85%.

ACID LACTIC.—Fair demand continues at unchanged price of £43 per ton for 50% by weight, technical quality.

ACID OXALIC.—The market is brighter with more inquiry, and price is very firm at £30 10s to £32 10s. per ton.

ACID TARTARIC.—Firmer conditions are noted, and although demand is not very active price is very firm at 1s. 4½d. per lb., less 5%.

ALUMINA SULPHATE.—An active demand has been experienced with the product in rather short supply for near delivery, price unchanged at £7 10s. to £8 per ton.

AMMONIUM CHLORIDE.—The firmness in the market is still in evidence, with some qualities scarce.

ARSENIC continues slow of sale and price easy at £16 5s. at the mines.

BARIUM CHLORIDE continues in short supply for early delivery, with price firm at £11 10s. to £12 per ton.

CREAM OF TARTAR.—Higher prices are now quoted at £94 to £98 10s. per ton for 99/100% B.P. quality, with position firmer.

COPPER SULPHATE.—Further increases have been reported, and the market is excited at the nominal figure of £33 per ton.

FORMALDEHYDE.—Better demand has been received, and price is unchanged at £39 per ton.

LEAD ACETATE has further advanced owing to the increase in lead prices; the nominal figure is £45 for white and £44 for brown, with an active demand.

LEAD NITRATE.—Unchanged at about £38 per ton.

LIME ACETATE.—The grey quality continues firm at £18 per ton, with an active demand.

LITHOPONE.—Unchanged at £19 15s. to £22 per ton.

METHYL ACETONE.—Much better business has been done, and price continues firm at £58 to £60 per ton.

POTASSIUM CARBONATE AND CAUSTIC.—No change.

POTASSIUM CHLORATE.—The market has been somewhat firmer, with inquiry active; present price £28 to £30 per ton.

POTASSIUM PERMANGANATE.—In fair demand at 5½d. per lb. for B.P. qualities.

POTASSIUM PRUSSIATE.—Much firmer conditions are reported, and the product is in brisk demand at £63 10s. to £65 10s.

SODIUM ACETATE is again firmer at £21 5s. to £22 5s. per ton, with inquiry increasing; supplies are on the short side.

SODIUM BICHROMATE.—The product is extremely firm at 3½d. per lb., with discounts for contracts, and little outside material is available.

SODIUM CHLORATE.—Demand has not been quite so good, but there is no change in the price, which is steady at £25 per ton.

SODIUM HYPOSULPHITE.—Fair business is reported, with an improving demand for photographic quality, and there is no change in the price.

SODIUM NITRITE.—Steady at about £20 per ton.

SODIUM PHOSPHATE.—Small trade is passing at £12 per ton for dibasic and £17 per ton for tribasic.

SODIUM PRUSSIATE.—A fair business is being done at the advanced figures of 4¾d. to 5¼d. per lb., according to quantity.

SODIUM SULPHIDE.—Only in small request, at unchanged prices.

TARTAR EMETIC.—In rather better demand, especially on export account, and price continues firm at 10¼d. per lb.

ZINC SULPHATE.—Better trade has been passing, and price is firm at £12 10s. per ton.

Coal Tar Products

The market for coal tar products remains very quiet and prices are practically unchanged. Benzols, solvent naphtha, etc., are still very unsettled, and only limited quantities are available.

MOTOR BENZOL is quoted at about 1s. 8¾d. per gallon f.o.r. makers' works.

SOLVENT NAPHTHA is quoted at 1s. 3d. per gallon f.o.r. makers' works.

HEAVY NAPHTHA is being quoted at 1s. 2¼d. per gallon.

CREOSOTE OIL still remains weak, being quoted at 4¾d. per gallon on rails in the North, and at 5¼d. per gallon in London.

CRESYLIC ACID is unchanged, the 98/100% quality being quoted at about 1s. 10d. per gallon, and the dark quality, 95/97%, at about 1s. 8d. per gallon f.o.r.

NAPHTHALENES.—The firelighter quality remains at about £4 10s. per ton, the 74/76 quality at £5 per ton, and the 76/78 quality at £6 to £6 5s. per ton.

PITCH remains weak, at 30s. to 32s. 6d. per ton f.o.b.

Nitrogen Products

Sulphate of Ammonia.—During the last week the price remained steady at £10 2s. per ton f.o.b. U.K. port in single bags. Good buying is reported from the Far East and from the British Colonies. We also understand that continental producers have made exceptionally large sales for consumption in continental countries.

In the home market it is reported that orders have been placed with makers in an unprecedented volume. It is reported, however, that stocks on the first of the month were large and that satisfactory deliveries are being effected all over the country.

Nitrate of Soda.—It is understood that good buying is reported in all continental countries at scale prices fixed by the Producers' Association. In the United States, however, the demand has not shown the same increase. The exceptionally good sales previously reported in these columns seem to portend a revival of prosperity for the nitrate industry.

Latest Oil Prices

LONDON, March 26.—LINSEED OIL was quiet at barely previous rates. Spot, ex-mill, £29; April, £28 5s.; May-August, £28 15s.; May-August, £28 15s.; and September-December, £29 5s., naked. RAPE OIL was inactive. Crude extracted, £42; and technical refined, £44, naked, ex-wharf. COTTON OIL was quiet. Egyptian crude, £28 10s.; refined common edible, £34; and deodorised, £36, naked, ex-mill. TURPENTINE was quiet and 6d. per cwt. lower. American, spot, 45s.; April to June, 45s. 3d.

HULL.—LINSEED OIL.—Spot to April, £28 10s.; May-August, £28 12s. 6d.; September-December, £29 per ton, naked. COTTON OIL.—Bombay, crude, £27; Egyptian, crude (new), and March-April, £27 10s.; edible refined, spot and March and April, £31; technical, spot, £31; deodorised, spot, £33 per ton, naked. PALM KERNEL OIL.—Crude, naked, 5½ per cent., spot, £35 10s. per ton. GROUNDNUT OIL.—Crushed-extracted, £34; deodorised, £38 per ton. SOYA OIL.—Extracted and crushed, £30 10s.; deodorised, £34 per ton. RAPE OIL.—Crushed-extracted, £42 10s.; refined, £44 10s. per ton, net cash terms, ex-mill. TURPENTINE, 47s. 6d. per ton. CASTOR OIL unaltered. COD OIL.—Spot 9d lower at 30s. per ton.

South Wales By-Products

WITH the Easter holidays ahead, there has been a slackening off in South Wales by-product activities. Business generally is on very quiet lines, and prices are easier. The patent fuel demand continues to be surprisingly small in view of the increased coal export, and pitch, consequently, has only a limited demand, with prices nominal at 32s. 6d. to 35s. per ton, delivered, and 31s. to 32s. per ton f.o.b. The demand for road tar is smaller, and values are nominal at 10s. to 13s. per 40-gallon barrel. Crude tar has weakened and, with the lower demand, prices have fallen two shillings per ton from 29s. to 31s. per ton to 27s. to 29s. per ton. Motor benzol maintains the advance which followed the increase in petrol prices, but creosote is weak, with values unchanged. Refined tars continue to have a fair call. Values are unchanged, coke oven tar being quoted from 7d. to 7¾d. per gallon delivered; and gasworks tar at from 6¼d. to 6¾d. per gallon delivered. Crude naphthalene has scarcely any demand round the 80s. per ton mark, while whizzed is slower, if anything, round the 100s. per ton mark. Patent fuel prices are being maintained, ex-ship Cardiff quotations being 21s. to 21s. 6d. per ton, and ex-ship Swansea from 19s. 3d. to 19s. 9d. per ton. Coke prices are: best foundry, 32s. 6d. to 36s. 6d.; good foundry, 26s. 6d. to 32s. 6d.; and furnace, 19s. to 21s. per ton. Oil imports into Swansea over the last four ascertainable weeks amounted to 38,358,925 gallons, another increase on previous imports. Of the imports, 2,624,825 gallons came from Trinidad, the remainder from Persia.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, March 27, 1929.

THE heavy chemical market during the past week has maintained the improvement previously reported, and there is no change of any importance to record.

Industrial Chemicals

ACETONE, B.G.S.—£76 10s. to £85 per ton ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—98/100% glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £38 per ton, packed in bags carriage paid U.K. stations. There are few fairly cheap offers made from the Continent.

ACID CARBOLIC, ICE CRYSTALS.—Unchanged at 6¼d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Quoted 2s. 2½d. per lb., less 5% ex store, spot delivery. Offered at 2s. 2¼d. per lb. less 5% ex wharf, prompt shipment from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality 4s. per carboy. Dearsenicated quality 5s. 6d. per carboy ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Price remains unchanged at about 3½d. per lb., ex store. Offered for prompt shipment from the Continent at 3¼d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton ex works for 144° quality; £5 15s. per ton for 168° quality. Dearsenicated quality 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Spot material now quoted 1s. 4½d. per lb., less 5% ex wharf.

ALUMINA SULPHATE.—Spot material rather dearer at about £6 per ton, ex store; for prompt shipment £5 15s. per ton, c.i.f. U.K. ports.

ALUM, LUMP POTASH.—Unchanged at about £8 12s. 6d. per ton, c.i.f. U.K. ports. Crystals Meal offered on spot at £9 per ton, ex store.

AMMONIA ANHYDROUS.—Quoted 9½d. per lb., carriage paid, containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered £38 per ton, packed in 5 cwt. casks delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanizers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Now quoted £37 10s. per ton, c.i.f. U.K. ports, prompt shipment from China. Spot material still on offer at £40 per ton, ex store.

ARSENIC, WHITE POWDERED.—Unchanged at £18 5s. per ton, ex wharf, prompt despatch from mines. Spot material still quoted £19 15s. per ton, ex store.

BARIUM CHLORIDE.—Quoted at £10 10s. per ton, c.i.f. U.K. ports, prompt shipments.

BLEACHING POWDER.—British manufacturers contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4 ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price £4 5s. to £4 15s. per ton, according to quality and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Good inquiry and price unchanged at about £37 10s. per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—On offer at £29 15s. per ton, ex store.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted £41 10s. per ton. Brown on offer about £39 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 4d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum, 2½ tons to be taken.

POTASSIUM CARBONATE, 96/98%.—Spot material now quoted £26 10s. per ton, ex store. Offered from the Continent, £25 10s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100%.—Powder quoted £25 10s. per ton, ex wharf. Crystals, 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Offered for prompt shipment from the Continent at 6¼d. per lb., ex wharf. Spot material quoted 7d. per lb., ex store.

SODA CAUSTIC, POWDERED, 98/99%.—Now £17 10s. per ton, in drums, £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums. 70/72%, £14 2s. 6d. per ton in drums, all carriage paid buyers' stations, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM ACETATE.—65% crystals quality quoted about £19 15s. per ton, ex wharf; 73/78% anhydrous quality on offer at £20 per ton, carriage paid, buyers' stations.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—3½d. per lb. delivered U.K. or c.i.f. Irish ports, less 2½% for contract, minimum 2½ tons.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, 27s. 6d. per ton extra. Light soda ash, £7 1s. 3d. per ton, ex quay, minimum 4-ton lots with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots; pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Ordinary quality quoted £10 12s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, usual extras for small quantities and refined qualities.

SODIUM SULPHATE (SALTCAKE).—Prices, 50s. per ton, ex works, 52s. 6d. per ton delivered for unground quality. Ground quality, 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption. Solid, 60/62%, £9 per ton. Broken, 60/62%, £10 per ton. Crystals, 30/32%; £7 2s. 6d. per ton, delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton; ex store.

ZINC CHLORIDE, 98%.—British material now quoted £22 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Assay of Coal: A Fuel Research Publication

THE latest publication of the Fuel Research Division of the Department of Scientific and Industrial Research is Fuel Research Technical Paper No. 21: "The Assay of Coal for Carbonisation Purposes—Part II," by J. G. King, C. Tasker and L. J. Edgcombe. (H.M. Stationery Office, pp. 34, 1s.)

This paper is a continuation of Fuel Research Technical Paper No. 1, which described an "assay" apparatus designed to assist in the laboratory examination of coals as to their suitability for carbonisation. The present paper gives further details of the considerations and experiments which led to the original design, together with the results of experience of over seven years' use of the apparatus at the Fuel Research Station and in the laboratories of the Physical and Chemical Survey of the National Coal Resources. It is thought that the information set out will be of assistance to all users of the apparatus, and in particular to those using it for the examination of the more strongly swelling coals. The paper includes sections on considerations affecting the design of the apparatus; the assay of strongly-swelling coals; differentiation of coals; evaluation of cannel coals and shales; large scale assay; correlation with gas works practice; experimental results; and the use of the Gray-King assay apparatus in the detailed examination of a coal seam.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, March 27, 1929.

In the early part of the period since last report the demand for chemical products here was moderately good, and, on the whole, a fair amount of business was put through. During the last day or two, however, there have been indications of the usual slackening off prior to the holiday break, with contract deliveries on a quieter scale. This condition will last probably throughout the greater part of next week. Meanwhile, quotations generally are steady to firm.

Heavy Chemicals

In the case of sulphide of sodium values are fully maintained at round £9 10s. per ton for the 60-65 per cent. concentrated solid quality and from £7 15s. to £8 for the commercial grade, though the movement in this section is only moderate. Buying interest in hyposulphite of soda has also been rather quiet, with prices steady at about £15 5s. per ton for the photographic material and £9 for the commercial. With regard to chlorate of soda, this meets with a moderate amount of enquiry at from 2⅝d. to 2⅞d. per lb. There has been some easing off in phosphate of soda, current offers of which are at £11 15s. to £12 per ton. Bicarbonate of soda continues to meet with a fair demand and values are firm at about £10 10s. per ton. There has been no quotable change in the position of caustic soda, contract quotations varying from £12 15s. to £14 per ton, according to quality, with business on steady lines. Similar conditions obtain in respect of alkali, offers of which are at round £6 per ton. Prussiate of soda is attracting a fair amount of attention from buyers and prices are firm at from 4½d. to 5d. per lb., according to quantity. Sales of saltcake are by no means extensive but at round £2 12s. 6d. per ton prices are much the same as before. There has been a quietly steady demand about for bichromate of soda, offers of which continue on the basis of 3½d. per lb.

In the potash section, yellow prussiate is firm at from 6¾d. to 7¼d. per lb., according to quantity, and inquiry for this material is fairly satisfactory. Permanganate of potash is on the quiet side, with the commercial quality obtainable at about 5¾d. per lb. and the B.P. at 5¼d. Caustic potash is maintained at from £33 5s. per ton for prompt delivery of one to five-ton lots, and sales have been on a moderate scale. Bichromate of potash has been moving in fair quantities at steady prices, these being on the basis of 4¼d. per lb. Enquiry for chlorate of potash this week has been rather inactive and at round 3d. per lb. slight easiness is in evidence. Carbonate of potash meets with a quietly steady demand and values of this material are firm at about £26 5s. per ton.

Comparatively little business has been reported in arsenic, supplies of which are obtainable at round £16 per ton, at the mines, for white powdered Cornish makes. In the case of sulphate of copper buyers are inclined to operate with caution for the time being; prices have firmed up appreciably in sympathy with the metal market, current quotations being at about £31 10s. per ton, f.o.b. Lead acetate is dearer for a similar reason, offers of white being at £41 10s. to £42 per ton and of brown at £41. The demand for the acetates of lime is on somewhat quiet lines at the moment, with prices about unchanged on the week at £8 15s. to £9 per ton for the brown quality and £17 for the grey.

Acids and Tar Products

Among the acid products, tartaric continues to display marked steadiness and a fair trade is being done at from 1s. 4½d. to 1s. 4¾d. per lb. Oxalic acid is still on the quiet side but prices are maintained at about £1 11s. 6d. per cwt. Citric acid is in moderate request with current offers at from 2s. 2d. to 2s. 3d. per lb. With regard to acetic acid, this material is well held and a fair business has been reported at round £66 per ton for the glacial quality and £36 for the 80 per cent. commercial.

The demand for pitch continues on a disappointing scale and values are easy at about £1 12s. 6d. per ton, f.o.b. Creosote oil is in quiet request, with offers at about 3¾d. per gallon, naked. There is a moderate inquiry about for solvent naphtha at 1s. 3d. per gallon. Crude carbolic acid is quoted this week at from 1s. 9d. to 1s. 10d. per gallon, according to position, with crystal steady and in fair demand at about 6½d. per lb.

Company News

Broken Hill South.—A dividend at the rate of 1s. 6d. is announced, payable on May 15.

American Potash and Chemical Co.—The board have declared a dividend of 25 cents per share, payable on March 30, 1929, to stockholders of record on March 20, 1929.

International Nickel Co. of Canada.—An initial quarterly dividend of $1·75 per share is announced on the preferred stock; payable on May 1 to holders registered on April 2.

German Potash Companies.—The Salzdetfurth concern report a net profit of £190,000 and again pays 15 per cent. dividend. The Ascherleben Works has had a net profit of £120,000 and distributes 10 per cent. The net profit of the Consolidated Westerregeln Potash Works also totalled £120,000 and paid a 10 per cent. dividend.

British Oil and Cake Mills.—The profit for the year 1928 amounted to £610,885, against £702,857 for 1927. After allowing for the preference dividend, the directors recommend a dividend on the preferred ordinary of 12½ per cent., less tax, the same as last year, and on the ordinary of 6 per cent., less tax, against 8½ per cent. for 1927, carrying forward £30,879, compared with £34,492 brought in. The annual meeting will be held at Winchester House, London, on April 9, at 12.30 p.m.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks, and Designs.

Opposition to the registration of the following Trade Marks can be lodged up to April 13, 1929.

Pluvex.

498,192. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. The Ruberoid Co., Ltd., Lincoln House, 296 to 302, High Holborn, London, W.C.1; manufacturers. December, 1928. To be Associated with No. 385,759 (2,124), xvii and others.

Vinylite.

496,444. Class 1. Paints, enamels, varnishes and lacquers. Carbide and Carbon Chemicals Corporation (a Corporation organised under the laws of the State of New York, United States of America), 30, East Forty-Second Street, City, County and State of New York, United States of America; manufacturers. October 29, 1928.

Ruberine.

498,193. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. The Ruberoid Co., Ltd., Lincoln House, 296 to 302, High Holborn, London, W.C.1; manufacturers. December 17, 1928. (To be Associated with No. 245,694 (1,262) and another.)

Neozone.

499,003. Class 1. Chemical substances for use in the manufacture of india-rubber to retard deterioration due to oxidation. E. I. Dupont De Nemours and Co. (a Corporation organised and existing under the laws of the State of Delaware, United States of America), 1007, Market Street, Wilmington, State of Delaware, United States of America; manufacturers. January 14, 1929.

Burgoyne's.

Advertised before acceptance, the applicants alleging distinctiveness.

485,794. Class 2. Chemical substances used for veterinary purposes. Burgoyne, Burbidges and Co., Ltd., High Street South, East Ham, London, E.6; wholesale manufacturing chemists. November 11, 1927. (To be Associated with No. 475,608 (2,551), iii and another.)

Digutin.

497,082. Class 3. Chemical substances prepared for use in medicine and pharmacy. The Wellcome Foundation, Ltd., 67, Holborn Viaduct, London, E.C.1; manufacturing chemists. November 15, 1928.

River Pollution and Smoke Abatement

F.B.I. Action

THE Federation of British Industries is taking action to consider what evidence shall be placed before the standing advisory committee on river pollution as to the facilities provided by local authorities for the reception of industrial effluents. The F.B.I. has set up a special committee representing those trades which have process effluents and also those utilising great quantities of water for process work, to consider and compile the evidence to be placed before the committee. Industry is naturally very closely concerned with the question of river pollution as affected by industrial effluents discharged from factories situated on the banks of or close to rivers, and this is intimately connected with the question of effluents entering local sewers. Accordingly, the Federation has asked the County Councils Association and the Association of Municipal Corporations for their views as to the desirability of asking the Government to consider the advisability of regarding the provision of sewage works by local authorities as falling within the field of unemployment relief. It is felt that much of the money at present spent without any economic return on unemployment might be employed to facilitate local authorities undertaking sewage schemes which are at present held up owing to local financial stringency.

A letter has been sent by the F.B.I. to the Ministry of Health on the subject of advisory committees for assisting in the carrying out of smoke abatement legislation. The letter recommends that such committees should be composed of nominees who are both properly accredited and technically qualified to deal with the various types of industrial problems, and that in every area special consideration should be given to the essentially difficult trades (whether carried on to any considerable extent or not), trades such as, for example, the chemical, brewing, metallurgical, and ceramic trades, and the sections of the textile trades.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CHEMICAL PRODUCTS.—Specifications have been issued by the Chilean State Railways giving details of their requirements of the following goods, for which tenders will be received at the Departamento de Materiales y Almacenes, Estacion Alameda, Santiago, up to 3 p.m. on May 7, 1929:—Chemical products, laboratory supplies, etc., including hydrochloric acid, nitric acid, sulphuric acid, alcohol (40°), borax, ferrocyanide and ferricyanide of potassium, "flyt" or similar insecticides, solid paraffin, caustic soda, petroleum jelly, etc. (Reference No. C3009.)

NAPHTHALENE AND CRESYLIC ACID.—A company in Los Angeles, California, desire quotations for crude naphthalene (warm pressed material for the purpose of re-subliming), and for cresylic acid (97–99 per cent.), pale in colour and of good odour). (Reference No. BX. 5173.)

International Travel Exhibition

AN International Travel Exhibition, under the popular title "Ideal Holidays," will be held at the Royal Agricultural Hall, London, in June next year. The organising manager is Miss Edith A. Browne, F.R.G.S., who was for many years associated with the organisation of the International Rubber Exhibitions held in London, New York, Brussels and Paris. It is recognised that holidays form a necessary part of the life of to-day and that large sums of money are spent on travel. But it has not yet been fully realised that the supply of holiday equipment, transport, hotels, and many other kindred businesses, are merely different branches of one great industry. The object of the exhibition is to emphasise this essential fact by bringing the various branches of the tourist industry together under one roof for their mutual benefit; its aim to provide a common meeting-ground for all interested in holidays and travel.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case, the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

LONGMATE (E. C.), LTD., Terrington St. John, manufacturing chemists. (M., 30/3/29.) Registered March 6, deb., to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank; general charge.

London Gazette, &c.

Companies Winding Up Voluntarily

NORTH BRITISH CHEMICAL CO (ENGLAND), LTD. (C.W.U.V., 30/3/29.) By special resolutions, February 27, confirmed March 15. H. Steele, 25, Brazennose Street, Manchester, Incorporated Accountant, appointed as liquidator, for the purposes of re-construction.

COUNTY CHEMICAL CO., LTD. (C.W.U.V., 30/3/29.) By resolutions, March 6. H. A. Green, 54, Bradford Street, Birmingham, appointed as liquidator for the purpose of reconstruction. Meeting of the creditors at the Grand Hotel, Birmingham, on Wednesday, April 10, at 12 noon.

Application for Discharge

SMITH, Wilfrid Cecil, described in the Receiving Order as Wilfred Smith, 37, Great Tower Street, London, E.C., Chemical merchant and agent. (A.F.D., 30/3/29.) Hearing, April 23, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

Receivership

BLUE SKY SOAP CO., LTD. (R., 30/3/29.) S. H. Gillett, of 24, Basinghall Street, E.C.2, was appointed receiver on March 11, 1929, under powers contained in debenture dated September 6, 1928.

New Companies Registered

BRUNLER FURNACE (FOREIGN) CO., LTD., 35, Walbrook, London, E.C.4. Registered March 20. Nom. capital, £15,000 in £1 shares (7,650 "A" ordinary and 7,350 "B" ordinary). To acquire and deal with certain inventions and processes applicable for the manufacture of cement and other materials, the melting and working of minerals and metals, and the manufacture and concentration of chemicals and other matters and various other purposes, and to adopt an agreement between O. Brunler and J. K. K. Paterson, and to carry on the business of manufacturers of and dealers in furnaces, kilns, boilers, jets and other plant, machinery, etc. Directors: O. Brunler, The Tiled Barn Cottage, Glatton, near Peterborough; J. K. K. Paterson.

NECKAR WATER SOFTENER CO., LTD., 96, Victoria Street, Westminster, London, S.W. Registered March 20. Nom. capital, £20,000 in £1 shares. To adopt an agreement with E. L. Landorph and A. Ernst, and to carry on the business of ironfounders, mechanical engineers, and manufacturers of machinery of all kinds; manufacturers, producers, importers and exporters of and dealers in all kinds of chemicals, drugs, colours, paint, dyestuffs, etc.

SUDAN SALT, LTD., Bevis Marks House, Bevis Marks, London, E.C.3. Registered as a "public" company on March 23. Nom. capital, £250,000 in £1 shares. To acquire a concession to manufacture salt, gypsum and other commodities at Port Sudan, and to adopt agreements: (1) with W. B. Hopkins (on behalf of himself and all other shareholders of Port Sudan Syndicate, Ltd.), (2) with A. Contomichalos, and (3) with the Port Sudan Syndicate, Ltd.